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VOLUME 2

## AMMUNITION—ASCALAPHUS

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[illegible]

# SCHEME OF SOUND SYMBOLS

## FOR THE PRONUNCIATION OF WORDS.

*Note.*—(·) is the mark dividing words respelt phonetically into syllables; (ˈ), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

| Sound-symbols employed in Respelling. | Representing the Sounds as exemplified in the Words. | Words respelt with Sound-symbols and Marks for Pronunciation. |
|---------------------------------------|--|---|
|---------------------------------------|--|---|

|    |   |                                   |
|----|---|-----------------------------------|
| ā  | ...mate, fate, fail, aye                              | ...māt, fāt, fāl, ā.              |
| ă  | ...mat, fat   | ...măt, făt.                      |
| â  | ...far, calm, father                                  | ...fâr, kâm, fâ'thēr.             |
| ă  | ...care, fair   | ...câr, fâr.                      |
| aw | ...fall, laud, law                                    | ...fawł, lawd, law.               |
| ē  | ...mete, meat, feet, free                             | ...mēt, mēt, fēt, frē.            |
| ě  | ...met, bed   | ...mět, běd.                      |
| é  | ...her, stir, heard, cur                              | ...hēr, stēr, hērd, kēr.          |
| î  | ...pine, ply, height                                  | ...pîn, plî, hît.                 |
| ĩ  | ...pin, nymph, ability                                | ...pîn, nîmf, â-bîl'î-tî.         |
| ō  | ...note, toll, soul                                   | ...nôt, tōl, sōl.                 |
| ǒ  | ...not, plot  | ...nôt, plôt.                     |
| ô  | ...move, smooth                                       | ...môv, smôth.                    |
| ö  | ...Goethe (similar to <i>e</i> in her)                | ...gö'téh.                        |
| ow | ...noun, bough, cow                                   | ...nown, bow, korō.               |
| oy | ...boy, boil  | ...boy, boyl.                     |
| û  | ...pure, dew, few                                     | ...pûr, âû, fû.                   |
| ũ  | ...bud, come, tough                                   | ...bûd, kâm, tûf.                 |
| ú  | ...full, push, good                                   | ...fûl, pûsh, gúd.                |
| ü  | ...French plume, Scotch guid                          | ...plûm, gûd.                     |
| ch | ...chair, match                                       | ...châr, mäch.                    |
| ch | ...German buch, Heidelberg,<br>Scotch loch (guttural) | ...bóch, hî'del-běrch, löch.      |
| g  | ...game, go, gun                                      | ...gām, gō, gûn.                  |
| j  | ...judge, gem, gin                                    | ...jûj, jēm, jîn.                 |
| k  | ...king, cat, cot, cut                                | ...kîng, kăt, kōt, kût.           |
| s  | ...sit, scene, cell, city, cypress                    | ...sît, sēn, sěl, sît'î, sî'prēs. |
| sh | ...shun, ambition                                     | ...shûn, âm-bîsh'ûn.              |
| th | ...thing, breath                                      | ...thîng, brēth.                  |
| th | ...though, breathe                                    | ...thō, brēth.                    |
| z  | ...zeal, maze, muse                                   | ...zěl, māz, mūz.                 |
| zh | ...azure, vision                                      | ...ăzh'er, vîzh'ûn.               |

THE JOURNAL OF THE

ROYAL SOCIETY OF MEDICINE



# ABBREVIATIONS USED IN THIS WORK.

a., or adj. . . adjective  
A.B. . . . . Bachelor of Arts  
abbr . . . . abbreviation, abbreviated  
abl. or abla. . . ablative  
Abp. . . . . Archbishop  
abt . . . . . about  
Acad. . . . . Academy  
acc. or ac. . . accusative  
accom. . . . . accommodated, accommodation  
act . . . . . active  
A.D. . . . . in the year of our Lord [*Anno Domini*]  
Adj. . . . . Adjutant  
Adm. . . . . Admiral  
adv. or ad. . . adverb  
A. F. . . . . Anglo-French  
Ag. . . . . Silver [*Argentum*]  
agri. . . . . agriculture  
A. L. . . . . Anglo-Latin  
Al. . . . . Aluminium  
Ala. . . . . Alabama  
Alb. . . . . Albanian  
alg. . . . . algebra  
A.M. . . . . before noon [*ante meridiem*]  
A.M. . . . . Master of Arts  
Am. . . . . Amos  
Amer. . . . . America, -n  
anat. . . . . anatomy, anatomical  
anc. . . . . ancient, anciently  
AN. M. . . . in the year of the world [*Anno Mundi*]  
anon. . . . . anonymous  
antiqu. . . . . antiquity, antiquities  
aor. . . . . aorist, -ic  
app. . . . . appendix  
appar. . . . . apparently  
Apr. . . . . April  
Ar. . . . . Arabic  
arch. . . . . architecture  
archæol. . . . archæology  
arith. . . . . arithmetic  
Ark. . . . . Arkansas  
art. . . . . article  
artil. . . . . artillery  
AS. . . . . Anglo-Saxon  
As. . . . . Arsenic  
Assoc. . . . . Association  
asst. . . . . assistant  
astrol. . . . . astrology  
astron. . . . . astronomy  
attrib. . . . . attributive  
atty. . . . . attorney  
at. wt. . . . . atomic weight  
Au. . . . . Gold [*Aurum*]

A.U.C. . . . . in the year of the building of the city (Rome) [*Anno Urbis conditæ*]  
Aug. . . . . August  
aug. . . . . augmentative  
Aust. . . . . Austrian  
A. V. . . . . authorized version [of Bible, 1611]  
avoir. . . . . avoirdupois  
B. . . . . Boron  
B. . . . . Britanic  
b. . . . . born  
Ba. . . . . Barium  
Bart. . . . . Baronet  
Bav. . . . . Bavarian  
bl.; bbl. . . . barrel; barrels  
B.C. . . . . before Christ  
B.C.L. . . . . Bachelor of Civil Law  
B.D. . . . . Bachelor of Divinity  
bef. . . . . before  
Belg. . . . . Belgic  
Beng. . . . . Bengali  
Bi. . . . . Bismuth  
biog. . . . . biography, biographical  
biol. . . . . biology  
B.L. . . . . Bachelor of Laws  
Bohem. . . . . Bohemian  
bot. . . . . botany, botanical  
Bp. . . . . Bishop  
Br. . . . . Bromine  
Braz. . . . . Brazilian  
Bret. . . . . Breton  
Brig. . . . . Brigadier  
Brit. . . . . British, Britannica  
bro. . . . . brother  
Bulg. . . . . Bulgarian  
bush. . . . . bushel, bushels  
C. . . . . Carbon  
c. . . . . century  
Ca. . . . . Calcium  
Cal. . . . . California  
Camb. . . . . Cambridge  
Can. . . . . Canada  
Cant. . . . . Canterbury  
cap. . . . . capital  
Capt. . . . . Captain  
Card. . . . . Cardinal  
carp. . . . . carpentry  
Cath. . . . . Catholic  
caus. . . . . causative  
cav. . . . . cavalry  
Cd. . . . . Cadmium  
Ce. . . . . Cerium  
Celt. . . . . Celtic  
cent. . . . . central  
cf. . . . . compare [*confer*]  
ch or chh. . . . church

# ABBREVIATIONS.

|               |                                 |                   |                                  |
|---------------|---------------------------------|-------------------|----------------------------------|
| Chal .....    | Chaldee                         | diff.....         | different, difference            |
| chap.....     | chapter                         | dim .....         | diminutive                       |
| chem .....    | chemistry, chemical             | dist... ..        | district                         |
| Chin .....    | Chinese                         | distrib... ..     | distributive                     |
| Chron.....    | Chronicles                      | div.....          | division                         |
| chron.....    | chronology                      | doz .....         | dozen                            |
| Cl .....      | Chlorine                        | Dr.....           | Doctor                           |
| Class.....    | Classical [= Greek and Latin]   | dr.....           | dram, drams                      |
| Co.....       | Cobalt                          | dram.....         | dramatic                         |
| Co... ..      | Company                         | Dut. or D...Dutch |                                  |
| co.... ..     | county                          | dwt .....         | pennyweight                      |
| cog.....      | cognate [with]                  | dynam or          |                                  |
| Col.....      | Colonel                         | dyn.....          | dynamics                         |
| Col .....     | Colossians                      | E.....            | Erbium                           |
| Coll .....    | College                         | E. or e.....      | East, -ern, -ward                |
| colloq.....   | colloquial                      | E. or Eng.....    | English                          |
| Colo.....     | Colorado                        | Eccl.....         | Ecclesiastes                     |
| Com.....      | Commodore                       | eccl. or .....    | ecclesiastical [affairs]         |
| com.....      | commerce, commercial            | eccles.....       |                                  |
| com.....      | common                          | ed .....          | edited, edition, editor          |
| comp.....     | compare                         | e.g.....          | for example [ex gratia]          |
| comp .....    | composition, compound           | E. Ind. or .....  | East Indies, East Indian         |
| compar....    | comparative                     | E. I. ....        |                                  |
| conch .....   | conchology                      | elect.....        | electricity                      |
| cong.....     | congress                        | Emp... ..         | Emperor                          |
| Congl.....    | Congregational                  | Encyc.....        | Encyclopedia                     |
| conj .....    | conjunction                     | Eng. or E.....    | English                          |
| Conn or Ct.   | Connecticut                     | engin.....        | engineering                      |
| contr.....    | contraction, contracted         | entom... ..       | entomology                       |
| Cop.....      | Coptic                          | env. ext....      | envoy extraordinary              |
| Cor.....      | Corinthians                     | ep.....           | epistle                          |
| Corn.....     | Cornish                         | Eph.....          | Ephesians                        |
| corr.....     | corresponding                   | Episc.....        | Episcopal                        |
| Cr .....      | Chromium                        | eq. or =...       | equal, equals                    |
| crystal.....  | crystallography                 | equiv.....        | equivalent                       |
| Cs .....      | Cæsium                          | esp.....          | especially                       |
| ct.....       | cent                            | Est .....         | Esther                           |
| Ct. or Conn.  | Connecticut                     | estab.....        | established                      |
| Cu.....       | Copper [Cuprum]                 | Esthon....        | Esthonian                        |
| cwt .....     | a hundred weight                | etc.....          | and others like [et cetera]      |
| Cyc.....      | Cyclopedia                      | Eth.....          | Ethiopic                         |
| D.....        | Didymium                        | ethnog.....       | ethnography                      |
| D. or Dut..   | Dutch                           | ethnol.....       | ethnology                        |
| d.....        | died                            | et seq.....       | and the following [et sequentia] |
| d. [l. s. d.] | penny, pence                    | etym.....         | etymology                        |
| Dan.....      | Daniel                          | Eur.....          | European                         |
| Dan.....      | Danish                          | Ex.....           | Exodus                           |
| dat .....     | dative                          | exclam .....      | exclamation                      |
| dau.....      | daughter                        | Ezek.....         | Ezekiel                          |
| D. C.....     | District of Columbia            | Ezr.....          | Ezra                             |
| D. C. L.....  | Doctor of Civil [or Common] Law | F.....            | Fluorine                         |
| D. D.....     | Doctor of Divinity              | F. or Fahr.       | Fahrenheit                       |
| Dec.....      | December                        | f. or fem...      | feminine                         |
| dec.....      | declension                      | F. or Fr....      | French                           |
| def.....      | definite, definition            | fa.....           | father                           |
| deg.....      | degree, degrees                 | Fahr. or F.       | Fahrenheit                       |
| Del.....      | Delaware                        | far.....          | farriery                         |
| del.....      | delegate, delegates             | Fe.....           | Iron [Ferrum]                    |
| dem... ..     | democratic                      | Feb.....          | February                         |
| dep.....      | deputy                          | fem or f. ..      | feminine                         |
| dep.....      | deponent                        | fig.....          | figure, figuratively             |
| dept.....     | department                      | Fin.....          | Finnish                          |
| deriv.....    | derivation, derivative          | F.—L.....         | French from Latin                |
| Deut.....     | Deuteronomy                     | Fla.....          | Florida                          |
| dial.....     | dialect, dialectal              | Flem.....         | Flemish                          |
| diam... ..    | diameter                        | for.....          | foreign                          |
| Dic.....      | Dictionary                      | fort.....         | fortification                    |
|               |                                 | Fr. or F....      | French                           |
|               |                                 | fr.....           | from                             |

# ABBREVIATIONS.

freq.....frequentative  
 Fris.....Frisian  
 ft.....foot, feet  
 fut.....future  
 G. or Ger...German  
 G.....Glucinium  
 Ga.....Gallium  
 Ga.....Georgia  
 Gael.....Gaelic  
 Gal.....Galatians  
 gal.....gallon  
 galv.....galvanism, galvanic  
 gard.....gardening  
 gen.....gender  
 Gen.....General  
 Gen.....Genesis  
 gen.....genitive  
 Geno.....Genoese  
 geog.....geography  
 geol.....geology  
 geom.....geometry  
 Ger.....German, Germany  
 Goth.....Gothic  
 Gov.....Governor  
 govt.....government  
 Gr.....Grand, Great  
 Gr.....Greek  
 gr.....grain, grains  
 gram.....grammar  
 Gr. Brit....Great Britain  
 Gris.....Grisons  
 gun.....gunnery  
 H.....Hegira  
 H.....Hydrogen  
 h.....hour, hours  
 Hab.....Habakkuk  
 Hag.....Haggai  
 H. B. M....His [or Her] Britan-  
                   nic Majesty  
 Heb.....Hebrew, Hebrews  
 her.....heraldry  
 herpet.....herpetology  
 Hg.....Mercury [*Hydrar-*  
                   *gyrum*]  
 hhd.....hogshead, hogsheads  
 Hind.....Hindustani, Hindu,  
                   or Hindi  
 hist.....history, historical  
 Hon.....Honorable  
 hort.....horticulture  
 Hos.....Hosea  
 Hung.....Hungarian  
 Hydros....Hydrostatics  
 I.....Iodine  
 I.; Is.....Island; Islands  
 Icel.....Icelandic  
 ichth.....ichthyology  
 Ida.....Idaho  
 i.e.....that is [*id est*]  
 Ill.....Illinois  
 illus.....illustration  
 impera or  
   impr.....imperative  
 impers.....impersonal  
 impf or imp.imperfect  
 impf. p. or  
   imp.....imperfect participle  
 improp....improperly  
 In.....Indium  
 in.....inch, inches  
 incept.....inceptive  
 Ind.....India. Indian  
 Ind.....Indiana

ind.....indicative  
 indef.....indefinite  
 Indo-Eur...Indo-European  
 inf.....infantry  
 inf or infin.infinite  
 instr.....instrument, -al  
 int.....interest  
 intens.....intensive  
 interj. or  
   int.....interjection  
 interrog...interrogative pro-  
                   noun  
 intr. or  
   intrans...intransitive  
 Io.....Iowa  
 Ir.....Iridium  
 Ir.....Irish  
 Iran.....Iranian  
 irr.....irregular, -ly  
 Is.....Isaiah  
 It.....Italian  
 Jan.....January  
 Jap.....Japanese  
 Jas.....James  
 Jer.....Jeremiah  
 Jn.....John  
 Josh.....Joshua  
 Jr.....Junior  
 Judg.....Judges  
 K.....Potassium [*Kalium*]  
 K.....Kings [in Bible]  
 K.....king  
 Kan.....Kansas  
 Kt.....Knight  
 Ky.....Kentucky  
 L.....Latin  
 L.....Lithium  
 l. [l. s. d.], } pound, pounds  
                   or £..... } [sterling]  
 La.....Lanthanum  
 La.....Louisiana  
 Lam.....Lamentations  
 Lang.....Languedoc  
 lang.....language  
 Lap.....Lapland  
 lat.....latitude  
 lb.; llb. or } pound; pounds  
                   lbs..... } [weight]  
 Let.....Lettish  
 Lev.....Leviticus  
 LG.....Low German  
 L.H.D.....Doctor of Polite Lit-  
                   erature  
 Lieut.....Lieutenant  
 Lim.....Limousin  
 Lin.....Linnæus, Linnæan  
 lit.....literal, -ly  
 lit.....literature  
 Lith.....Lithuanian  
 lithog.....lithograph, -y  
 LL.....Late Latin, Low  
                   Latin  
 LL.D.....Doctor of Laws  
 long.....longitude  
 Luth.....Lutheran  
 M.....Middle  
 M.....Monsieur  
 m.....mile, miles  
 m. or masc.masculine  
 M.A.....Master of Arts  
 Macc.....Maccabees  
 mach.....machinery  
 Mag.....Magazine



# ABBREVIATIONS.

Maj.....Major  
 Mal.....Malachi  
 Mal.....Malay, Malayan  
 manuf.....manufacturing,  
                   manufacturers  
 Mar.....March  
 masc or m.....masculine  
 Mass.....Massachusetts  
 math.....mathematics, math-  
                   ematical  
 Matt.....Matthew  
 M.D.....Doctor of Medicine  
 MD.....Middle Dutch  
 Md.....Maryland  
 ME.....Middle English, or  
                   Old English  
 Me.....Maine  
 mech.....mechanics, mechan-  
                   ical  
 med.....medicine, medical  
 mem.....member  
 mensur.....mensuration  
 Messrs. or  
     MM.....Gentlemen, Sirs  
 metal.....metallurgy  
 metaph.....metaphysics, meta-  
                   physical  
 meteor.....meteorology  
 Meth.....Methodist  
 Mex.....Mexican  
 Mg.....Magnesium  
 M.Gr.....Middle Greek  
 MHG.....Middle High Ger-  
                   man  
 Mic.....Micah  
 Mich.....Michigan  
 mid.....middle [voice]  
 Milan.....Milanese  
 mid. L. or } Middle Latin, Me-  
     ML..... } diæval Latin  
 milit. or  
     mil.... military [affairs]  
 min.....minute, minutes  
 mineral.....mineralogy  
 Minn.....Minnesota  
 Min. Plen..Minister Plenipoten-  
                   tiary  
 Miss.....Mississippi  
 ML. or } Middle Latin, Me-  
     mid. L... } diæval Latin  
 MLG.....Middle Low German.  
 Mlle.....Mademoiselle  
 Mme.....Madam  
 Mn.....Manganese  
 Mo.....Missouri  
 Mo.....Molybdenum  
 mod.....modern  
 Mont.....Montana  
 Mr.....Master [Mister]  
 Mrs.....Mistress [Missis]  
 MS.; MSS..manuscript; manu-  
                   scripts  
 Mt.....Mount, mountain  
 mus.....music  
 mus.doc....Doctor of Music  
 myth.....mythology, mytho-  
                   logical  
 N.....Nitrogen  
 N. or n.....North, -ern, -ward  
 n.....noun  
 n or neut...neuter  
 Na.....Sodium [*Natrium*]  
 Nah.....Nahum

N. A., or  
     N. Amer.North America, -n  
 nat.....natural  
 naut.....nautical  
 nav.....navigation, naval af-  
                   fairs  
 Nb.....Niobium  
 N. C. or  
     N. Car...North Carolina  
 N. D.....North Dakota  
 Neb.....Nebraska  
 neg.....negative  
 Neh.....Nehemiah  
 N. Eng.....New England  
 neut or n...neuter  
 Nev.....Nevada  
 N.Gr.....New Greek, Modern  
                   Greek  
 N. H.....New Hampshire  
 NHG.....New High German  
                   [German]  
 Ni.....Nickel  
 N. J.....New Jersey  
 NL.....New Latin, Modern  
                   Latin  
 N. Mex. ...New Mexico  
 N. T. or  
     N. Test...New Testament  
 N. Y. ....New York [State]  
 nom.....nominative  
 Norm. F ..Norman French  
 North. E ..Northern English  
 Norw... ..Norwegian, Norse  
 Nov.....November  
 Num.....Numbers  
 numis.....numismatics  
 O.....Ohio  
 O.....Old  
 O.....Oxygen  
 Obad.....Obadiah  
 obj.....objective  
 obs. or † ..obsolete  
 obsoles ..obsolescent  
 O.Bulg ...Old Bulgarian or Old  
                   Slavic  
 Oct.....October  
 Odontog...odontography  
 OE.....Old English  
 OF or  
     O. Fr....Old French  
 OHG.....Old High German  
 Ont.....Ontario  
 opt .. ..optics, optical  
 Or.....Oregon  
 ord.....order  
 ord.... ..ordnance  
 org.....organic  
 orig .. ..original, -ly  
 ornith.....ornithology  
 Os.....Osmium  
 OS. ....Old Saxon  
 O. T., or  
     O. Test...Old Testament  
 Oxf.....Oxford  
 oz.....ounce, ounces  
 P.....Phosphorus  
 p.; pp.....page; pages  
 p., or part..participle  
 Pa. or Penn.Pennsylvania  
 paint .. ..painting  
 palæon.....palæontology  
 parl.....parliament  
 pass.....passive



# ABBREVIATIONS.

pathol or  
   path.....pathology  
 Pb.....Lead [*Plumbum*]  
 Pd.....Palladium  
 Penn or Pa.Pennsylvania  
 perf.....perfect  
 perh.....perhaps  
 Pers.....Persian, Persic  
 pers.....person  
 persp.....perspective  
 pert.....pertaining [to]  
 Pet.....Peter  
 Pg. or Port.Portuguese  
 phar.....pharmacy  
 PH.D.....Doctor of Philoso-  
           phy  
 Phen.....Phenician  
 Phil.....Philippians  
 Philem. ....Philemon  
 philol. ....philology, philologi-  
           cal  
 philos.     { philosophy, philo-  
           or phil .. } sophical  
 phonog....phonography  
 photog....photography  
 phren....phrenology  
 phys.....physics, physical  
 physiol...physiology, physi-  
           ological  
 Pied.....Piedmontese  
 Pl.....Plate  
 pl. or plu..plural  
 Pl. D.....Platt Deutsch  
 plupf.....pluperfect  
 P.M.....,afternoon[*post meri-  
           diem*]  
 pneum....pneumatics  
 P. O.....Post-office  
 poet.....poetical  
 Pol.....Polish  
 pol econ...political economy  
 polit.....politics, political  
 pop .. ....population  
 Port. or Pg.Portuguese  
 poss.....possessive  
 pp.....pages  
 pp.....past participle. per-  
           fect participle  
 p. pr.....present participle  
 Pr. or Prov.Provengal  
 pref.....prefix  
 prep.....preposition  
 Pres.....President  
 pres.....present  
 Presb.....Presbyterian  
 pret.....preterit  
 prim.....primitive  
 priv.....privative  
 prob.....probably, probable  
 Prof.....Professor  
 pron.....pronoun  
 pron.....pronunciation, pro-  
           nounced  
 prop.....properly  
 pros.....prosody  
 Prot. ....Protestant  
 Prov.or Pr.Provengal  
 Prov.....Proverbs  
 prov.....province, provincial  
 Prov. Eng..Provincial English  
 Prus.....Prussia, -ii  
 Ps.....Psalm, Psalms  
 psychol...psychology

pt.....past tense  
 pt.....pint  
 Pt.....Platinum  
 pub.....published, publisher,  
           publication  
 pwt.....pennyweight  
 Q.....Quebec  
 qt.....quart  
 qtr.....quarter [weight]  
 qu.....query  
 q.v.....which see [*quod  
           vide*]  
 R.....Rhodium  
 R.....River  
 Rb.....Rubidium  
 R. Cath...Roman Catholic  
 rec.sec .. recording secretary  
 Ref.....Reformed  
 refl.....reflex  
 reg.....regular, -ly  
 regt.....regiment  
 rel. pro. or  
   rel.....relative pronoun  
 repr.....representing  
 repub.....republican  
 Rev .. ....Revelation  
 Rev.....The Reverend  
 Rev. V....Revised Version  
 rhet.....rhetoric, -al  
 R. I.....Rhode Island  
 R. N.....Royal Navy  
 Rom.....Roman, Romans  
 Rom.....Romanic or Ro-  
           mance  
 Rom. Cath. { Roman Catholic  
           Ch. or R. } Church  
           C. Ch.... }  
 r.r.....railroad  
 Rt. Rev .. Right Reverend  
 Ru.....Ruthenium  
 Russ.....Russian  
 r.w.....railway  
 S.....Saxon  
 S.....Sulphur  
 s.....second, seconds  
 s. [l. s. d.]..shilling, shillings  
 S. or s.....South, -ern, -ward  
 S. A. or  
   S. Amer..South America, -n  
 Sam.....Samaritan  
 Sam.....Samuel  
 Sans, or  
   Skr.....Sanskrit  
 Sb.....Antimony [*Stibium*]  
 s.c.....understand, supply,  
           namely [*scilicet*]  
 S. C. or  
   S. Car....South Carolina  
 Scand.....Scandinavian  
 Scot.....Scotland, Scotch  
 scr.....scruple, scruples  
 Scrip.....Scripture [s], Scrip-  
           tural  
 sculp.....sculpture  
 S. D.....South Dakota  
 Se.....Selenium  
 sec .. ....secretary  
 sec.....section  
 Sem.....Semitic  
 Sep .. ....September  
 Serv.....Servian  
 Shaks.....Shakespeare  
 Si.....Silicon

# ABBREVIATIONS.

|               |                           |              |                                      |
|---------------|---------------------------|--------------|--------------------------------------|
| Sic.....      | Sicilian                  | trigon.....  | trigonometry                         |
| sing.....     | singular                  | Turk.....    | Turkish                              |
| sis.....      | sister                    | typog.....   | typography, typographical            |
| Skr. or       |                           | U.....       | Uranium                              |
| Sans.....     | Sanskrit                  | ult.....     | ultimate, -ly                        |
| Slav.....     | Slavonic, Slavic          | Unit.....    | Unitarian                            |
| Sn.....       | Tin [ <i>Stannum</i> ]    | Univ.....    | Universalist                         |
| Soc.....      | Society                   | Univ... ..   | University                           |
| Song Sol...   | Song of Solomon           | U. Presb...  | United Presbyterian                  |
| Sp.....       | Spanish                   | U. S... ..   | United States                        |
| sp. gr... ..  | specific gravity          | U. S. A..... | United States Army                   |
| sq.....       | square                    | U. S. N..... | United States Navy                   |
| Sr.....       | Senior                    | Ut.....      | Utah                                 |
| Sr.....       | Strontium                 | V.....       | Vanadium                             |
| .....         | Saint                     | v.....       | verb                                 |
| .....         | street                    | Va.....      | Virginia                             |
| stat.....     | statute                   | var.....     | variant [word]                       |
| s.t.d.....    | Doctor of Sacred Theology | var.....     | variety of [species]                 |
| subj.....     | subjunctive               | Ven.....     | Venerable                            |
| suf.....      | suffix                    | Venet.....   | Venetian                             |
| Su. Goth...   | Suo-Gothic                | vet....      | veterinary                           |
| superl... ..  | superlative               | v. i. or     |                                      |
| Supp.....     | Supplement                | v. intr....  | verb intransitive                    |
| Supt.....     | Superintendent            | vil.....     | village                              |
| surg.....     | surgery, surgical         | viz.....     | namely, to-wit [ <i>vide-licet</i> ] |
| Surv.....     | surveying                 | v. n.....    | verb neuter                          |
| Sw.....       | Swedish                   | voc.....     | vocative                             |
| Swab.....     | Swabian                   | vol.....     | volume                               |
| sym.....      | symbol                    | vols.....    | volunteers                           |
| syn.....      | synonym. -y               | Vt.....      | Vermont                              |
| Syr.....      | Syriac, Syrian            | v. tr.....   | verb transitive                      |
| t.....        | town                      | W.....       | Tungsten [ <i>Wolfram</i> ]          |
| Ta... ..      | Tantalum                  | W.....       | Welsh                                |
| Tart.....     | Tartar                    | W. or w....  | West, -ern, -ward                    |
| Te.....       | Tellurium                 | Wal.....     | Walachian                            |
| technol...    | technology                | Wall.....    | Walloon                              |
| teleg.....    | telegraphy                | Wash.....    | Washington                           |
| Tenn.....     | Tennessee                 | Westph....   | Westphalia, -n                       |
| term.....     | termination               | W. Ind. ...  | West Indies, West Indian             |
| terr.....     | territory                 | or W. I... } | Indian                               |
| Teut.....     | Teutonic                  | Wis.....     | Wisconsin                            |
| Tex.....      | Texas                     | wt.....      | weight                               |
| Th.....       | Thorium                   | W. Va.....   | West Virginia                        |
| theat.....    | theatrical                | Wyo.....     | Wyoming                              |
| theol.....    | theology, theological     | Y.....       | Yttrium                              |
| therap.....   | therapeutics              | yd.....      | yard                                 |
| Thess.....    | Thessalonians             | yr.....      | year                                 |
| Ti.....       | Titanium                  | Zech.....    | Zechariah                            |
| Tim.....      | Timothy                   | Zeph.....    | Zephaniah                            |
| Tit.....      | Titus                     | Zn.....      | Zinc                                 |
| Tl.....       | Thallium                  | zool.....    | zoology, zoological                  |
| toxicol...    | toxicology                | Zr.....      | Zirconium                            |
| tp.....       | township                  |              |                                      |
| tr. or trans. | transitive                |              |                                      |
| transl.....   | translation, translated   |              |                                      |

See also ABBREVIATIONS: in Vol. 1.

# THE IMPERIAL CYCLOPEDIA AND DICTIONARY.

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AMMUNITION, n. *ăm-mū-nīsh'ŭn* [mid. L. *admūnitio*, the act of fortifying—from *ad*, *mūnitio*, I fortify; L. *ad*, F. *munition*, ammunition—from L. *mūniō*, I fortify]: military stores or provisions for attack or defence—as powder, ball, shells, etc., etc. Sometimes this name has been given to cannon and mortars, and to muskets, swords, bayonets, and other small arms, as well as to the projectiles and explosives used with them; but in modern usage generally A. denotes only the projectiles and explosives—such as shot, shell, gun-powder, guncotton, emmensite, etc., cartridges, fuses, wads, grenades, etc. *Fixed A.* comprises the loaded shells, cartridges, and carcasses. *Unfixed A.* are unfilled case-shot, grape-shot, and shell. *Field A.* consists of shot, loaded shell, case-shot, shrapnel, cartridges, priming tubes, matches, portfires, etc., and rockets for rocket batteries. The various compositions required during a siege are generally kept in magazines, ready to be made up as occasion demands, though in time of war it is the practice to have a certain number of rounds prepared and ready for use. In the case of gun-powder, great precaution has to be taken against fire and moisture, and in the case of some of the high explosives even greater precaution is necessary. Nitroglycerine, for example, is liable to spontaneous explosion, and is dangerous to handle, and some of the chlorates, which contain sulphur and are therefore liable to explode from slight friction or percussion, have many times the explosive intensity of gun-powder, and in addition are more dangerous to handle. Infantry soldiers generally carry 60 rounds each in their cartridge boxes, similar or larger quantities per man being carried by army wagons. Another supply is kept with the A. reserve and a third supply follows the army in wagons or is kept stored in depots at various points. The making of A. for the British army and navy is mostly conducted at Woolwich, England; in the U. S. much A. is manufactured at Frankford, Pa., and near Wilmington, Del. For the chief kinds of A., see the several titles (SHOT: SHELL etc.); also CANNON: EXPLOSIVES: GUNNERY: etc.



## AMNESIA—AMNION.

**AMNESIA**, n. *ăm-ně'sī-a* [Gr. *a*, without, and root *mnēs*, meaning memory]: loss of memory. In particular, defective memory of words; inability to recall the word that is wanted. *Acoustic A.* is loss of memory of the meaning of words spoken, sometimes called word-deafness. **AMNESIC**, a. *ăm-ně'sīk*, exhibiting the characters of *amnesia*.

**AMNESTY**, n. *ăm'něs-tī* [Gr. and L. *amnestiā*, forgetfulness of the past. F. *amnestie*]: a general pardon of past offenses by a government; an act of oblivion. the effect of it is, that the crimes and offenses against the state, specified in the act, are so obliterated that they can never again be charged against the guilty parties. The *A.* may be either absolute, or qualified with exceptions. Instances of the latter are to be found in ancient and modern history: thus, Thrasybulus, when he overthrew the oligarchy in Athens, caused an *A.* to be proclaimed, from the operation of which the Thirty Tyrants, who had formed the oligarchy, and some few persons who had acted under them, were excluded. Bonaparte, on his return from Elba in 1815, issued a decree, published at Lyons, declaring an *A.*, from the benefits of which he excepted thirteen persons whom he named. In the act of indemnity passed upon the restoration of Charles II., the persons actually concerned in his father's execution were, as a class, excluded from the *A.*

Pres. Andrew Johnson proclaimed a full pardon and *A.*, 1868, Dec. 25, to all persons who had either directly or indirectly participated in the rebellion of the southern states against the U. S. govt.—In general 'all peace implies *A.* or oblivion of past subjects of dispute, whether expressly mentioned in the terms of the treaty or not.' (*Woolsey*).

**AMNICOLA**, n. *ăm-nīk'ō-la* [L. *amnis*, river; *cola*, inhabiting]: genus of freshwater mollusks, fam. *Rissoidæ*, **AMNICOLIDÆ**, n. plu. *ăm-nī kōl'ī-dē*, family of mollusks of which *Amnicola* is the type genus. **AMNICOLINE**, a. *ăm-nīk'ō-līn*, pertaining to the genus *Amnicola*, or fam. *Amnicolidæ*.

**AMNIGENOUS**, a. *ăm-nīj'ē-nūs* [L. *amnis*, river; *gen*, root; signifying origin, birth]: river born; originating in a river.

**AMNION**, n. *ăm'nī-ōn*, or **AM'NIOS** [Gr. *amnion*, the membrane which envelops the foetus—from *amnos*, a lamb—so called from its softness to the touch]: in *anat.*, the inner membrane covering the foetus; in *bot.*, the covering of the embryo of the seed. **AMNIOTA**, n. plu. *ăm'nī-ō'tā*, the Vertebrata in which the foetus is furnished with an amnion, as reptiles, birds and mammals. **AMNIOTIC**, a. *ăm'nī-ōt'īk*, pertaining to.

**AMNION**: the membrane which immediately invests the embryo, appearing very early in the development of the latter, and adhering closely to it. As gestation proceeds, this membrane secretes from its inner surface a fluid which separates it from the foetus. This fluid, the liquor amnii, consists of water, with albumen, salt of soda, and extractive



## AMŒBA—AMoor.

matters in solution; it has a specific gravity of 1008. It supplies nutriment to the fœtus, preserves around it an agreeable temperature, and when gestation is completed, by projecting the membrane through the os uteri, is the primary agent in opening the way for the fœtus. At this time the A. is thin and transparent, slightly flocculent on the side next its enveloping membrane, the chorion, but smooth on the surface next the fœtus. Within it the latter is suspended in the fluid which not only serves the purposes just mentioned, but protects it from injury. For further particulars, see EMBRYO: for curious superstitions connected with the subject, see CAUL.

AMŒBA, n. *ăm-ě'bă* [Gr. *amoibē*, a change, alternation]: the Proteus animalcule—so called from the numerous changes of form into which it can throw itself. AMŒBÆ, n. plu. *-bē*. AMŒBÆ'AN, a. *-bē'ăn*, of or pertaining to the amœbæ. AMŒBIFORM, a. *-bī-fawrm* [L. *forma*, shape]: or AMŒBOID, a. *-boyd* [Gr. *eidos*, resemblance]: resembling an amœba in form.

AMŒBA: the lowest kind of Rhizopods (q.v.), and one of the lowest animal structures. The animal is a jelly-like mass, without definite shape, nearly uniform in texture, but having a pulsating vesicle. The A. feeds by closing around its prey, enfolding it in its own substance, and then digesting it, any undigested portion being finally protruded. See PROTEUS: RHIZOPODA.

AMOL, *ă-mōl'*: town of Persia, prov. of Mazanderam, on the Heraz, a river which flows into the Caspian Sea; 76 m. n.e. from Teheran. The town is unwalled, but has good bazaars, and is a place of considerable prosperity and wealth. The river, which is powerful and rapid, is crossed by a bridge of twelve arches. Extensive ruins indicate the former importance of A. Its most notable building is the mausoleum of Seyed Quam-u-deen, king of Sari and Amol, who died 1378. In the suburbs are a grand palace, which once belonged to Shah Abbas, and three towers, said to have been temples of the ancient Guebres, or fire-worshippers. The inhabitants of A. cultivate rice and cotton, or are employed in the iron forges and cannon-foundries of the district. Pop. in winter, when greatest, estimated 35,000 or 40,000; in summer, many of the inhabitants retire to summer residences in the mountains, which, on the s., approach within about five or six m. of the town.

AMOMUM, *ă-mō'mūm*: genus of plants of the natural order *Scitamineæ* (q.v.) or *Zingiberaceæ*, distinguished by perennial stems; the flowers in close heads resembling cones. It contains a number of species, natives of tropical countries (chiefly in the East), of which several yield CARDAMOMS (q.v.), and several GRAINS OF PARADISE (q.v.). The genus A. formerly included species now forming the genus *Zingiber* (see GINGER), etc.

AMONG, *ă-mŭng'*, or AMONGST, *ă-mŭngst'*, prep. [AS. *amang* or *onmang*]: mingled or conjoined with.

AMoor, or AMUR, *ă-môr'*: river formed by the junction

(about lat.  $53^{\circ}$  n., and long.  $120^{\circ}$  e.) of the Shilka and the Argoun, both which come from the s.w.—the former rising in Russian Siberia, near the head-waters of the Yenisei; and the latter in Chinese Tatar, not far from the sandy plateau of Kobi. From this starting-point, the A. presents, on its right, a tolerably symmetrical curve, which, after receiving, at its most southerly point, the Songari from beyond the Wall of China, besides other considerable feeders on both sides of either segment, enters, on nearly its original parallel, the Gulf of Saghalien, about a degree below the Sea of Okhotsk, properly so called. Great additions have been made to our knowledge of this large and important river within the last few years. It has been ascertained that its basin comprehends about 766,000 sq. m., and that its length is about 2,500 m. Steamboats of light draught ascend it as high as Ust Strelka, at the junction of the Shilka; and that river is navigable for boats to the foot of the Yablonoi range in eastern Siberia, part of which lies in the basin of the A. The Russians, after conquering Siberia in the 16th c., turned their attention immediately to the advantages which the possession of this river offered. The territory and the people had always been under possession by China—or in some connection with China—the people sometimes tributaries, at other times conquerors. As early as 1636, Russian adventurers made excursions into the Chinese territories of the lower A. In 1666, they built a fort at Albazin, and succeeded in navigating from that fort to the mouth of the river. In 1685, the fort was taken and destroyed by the Chinese, but was retaken promptly by the Russians, who, however, abandoned it and the whole of the A. to the Chinese. But Russian writers did not cease to keep alive in the minds of their fellow-subjects that the lower A. belonged to them; and the fur-hunters of Siberia, encouraged by government, continued to pursue their vocation on Chinese ground. In 1854–56, two military expeditions were conducted by Count Muravieff, who twice descended the A. from the mouth of the Shilka, unopposed by the Chinese. This was during the Crimean war. On the arrival of news of peace, the Russians were left to strengthen their positions at the mouth and other parts of the A. In 1857, Count Putiatin endeavored in vain to obtain from China concessions on the river in favor of Russia. In 1858, the war between China and Great Britain and France induced China to agree to the treaty of Tientsin, by which the boundaries of Russia and China were defined. Several towns were, as the result, established by the former of these two powers on the left bank of the A., of which the largest are Khabarooka and Sofyensk; and an A. trading company was established. In 1860, after the occupation of Peking by the British and French, in less than a month after Lord Elgin and Baron Gros had affixed their signatures to the peace conventions at Peking, Gen. Ignatieff secured the signature of Prince Kung to a treaty, by which Russia acquired the broad and wide territory comprised between the river A. and the mouth of the Tumên, extending ten degrees of latitude nearer the temperate regions, and running from the



## AMORITES—AMORPHOUS.

shore of the North Pacific e. to the banks of the river *Usuri*, a principal affluent of the *A.* An enormous advantage to Russia of this acquisition of territory was the fact that it conferred on that country the advantage of harbors on the Pacific in a comparatively temperate latitude, where navigation is impeded by ice for at most three or four months a year. On the bay of *Passiett*, to the s. of this region, lying at a point where the Russian, Chinese, and Corean frontiers adjoin each other, there are a large trading town and a military station. Sixty or seventy m. n. is the important harbor of *Vladivostok* ('Rule of the East'), or *Port May*, which, 1872, was placed in telegraphic communication with Europe by the China submarine cable, and is now the capital of the *Amoor* provinces. The island of *Saghalien* (q.v.), lying immediately north of the Japan group, along a portion of the coast of Asiatic Russia, and formerly possessed partly by Russia and partly by Japan, in 1875 was taken entire possession of by the former; and in 1900, Sept., Russia took armed possession of the right bank of the river.

**AMORITES**, *ăm'o-rīts*: a powerful nation of *Canaan*, on both sides of the *Jordan*. They were vanquished by the *Hebrews* under *Moses*, and their lands beyond *Jordan* were distributed among the tribes of *Gad*, *Reuben*, and *Manasseh*. Their two most famous kings were *Sihon*, king of *Heshbon*, and *Og*, king of *Bashan*. *Og* was the last of the giants, or at least of that gigantic race, the *Rephaim*. In *Deut.* iii. 11, his iron bedstead is mentioned as measuring  $13\frac{1}{2}$  ft. in length; but the whole of this verse, with the exception of the first clause, is considered by some an interpolation. It is a fable of the *Rabbins* that this bedstead was *Og's* cradle, and that his full-grown stature was 120 feet! *Joshua* subdued, but did not wholly exterminate, the *Amorites* in *Canaan*. The residue of this people became tributary under *Solomon*. (*Gen.* x. 15-20; xv. 19-21; *Numb.* xiii. 29; xxi. 13; *Deut.* xx. 16; xii. 31; *Joshua*, ix.)

**AMOROSO**, *ăm-ō-rō'sō*, in *Music*: affectionately, tenderly.

**AMOROUS**, a. *ăm'ō-rūs* [mid. L. *amorōsus*, full of love, *amorous*—from L. *amor*, love: F. *amoureux*]: full of love; fond; loving; inclined to love. **AM'OROUSLY**, ad. *-lī*, fondly; lovingly. **AM'OROUSNESS**, n. fondness; being inclined to love. **AMORETTE**, n. *ăm'ō-rět'* [F. *amourette*, a love affair]: an *amorous* woman; love knots or flowers.—**SYN.** of 'amorous': loving; fond; passionate, tender.

**AMOR'PHA**: see **INDIGO**.

**AMORPHII**, n. plu. *ă-mōr'fī-ī* [Gr. *a*, without; *morphē*, shape, form]: things or creatures that have no regular or definite form. **AMOR'PHISM**, n. *-fīzm*, a condition of shapelessness. **AMORPHOUS**, a. *ă-mōr'fūs*, having no regular structure or definite form. **AMORPHOZOA**, n. *ă-mōr'fō-zō'ă* [Gr. *zoōn*, an animal]: a name sometimes given to the sponges.

**AMORPHOPHALLUS**: see **ARUM**.

**AMORPHOUS**, *ă-mōr'fūs*, in *Chemistry*: the uncrystallized, in opposition to the crystallized, condition of bodies.

## AMORTIZE—AMOY.

There are substances which, in certain conditions, are capable of crystallization, but in other conditions remain A. Thus, pure sugar contains carbon, which appears as an A. substance after the sugar has been burned in a platina crucible. The same substance, carbon, appears in its crystallized form in the diamond.

AMORTIZE, v. *ă-môr'tîz* [Norm. F. *amortizer*; Sp. *amortizar*, to render inalienable—from L. *ad*, at; *mortem*, death]: to transfer lands to mortmain; in *OE.*, to destroy or render useless. AMOR'TIZED, pp. *-tîzd*. AMORTISSEMENT, n. *ă-môr'tîs-măng'*, or AMOR'TIZA'TION, n. [F. *amortissement*, a liquidation, a paying off—from *amortir*, to quench or deaden]: the reduction or paying off a public debt by means of a sinking fund; a sinking fund. AMOR'TIZA'TION, n. *-tî-ză'shŭn*, the alienation of lands in mortmain, as to a corporation or community which ceases not to exist. AMORT, ad. *ă-môr't'* [Norm. F. *amort*, dead]: in *OE.*, as if dead; dejected; depressed.

AMOS, *ă'mos*: Hebrew prophet, abt. B.C. 784: a herdsman of Tekoa, in the neighborhood of Bethlehem, also a dresser of sycamore trees. During the reigns of Uzziah in Judah, and Jeroboam in Israel, he came forward to denounce the idolatry then prevalent. His prophetic writings contain, in the first six chapters, denunciations of the divine displeasure against several states, particularly that of Israel, on account of the worship of idols. The three remaining chapters contain his symbolical visions of the approaching overthrow of the kingdom of Israel, and lastly, a promise of restoration. The style of A., remarkable for its clearness and picturesque vigor, abounds with images taken from rural and pastoral life. The canonicity of the book of Amos is well attested both by Jewish and Christian authorities.

AMOSKEAG: see MANCHESTER, N. H.

AMOUNT, v. *ă-mownt'* [OF. *amonter*, to mount up—from L. *ad*; F. *monter*, to ascend—from L. *montem*, a mountain]: to rise up to in the whole; to reach or extend to: N. sum total; the whole; the result. AMOUNT'ING, imp. AMOUNTED, pp.

AMOUR, n. *ă-môr'* [F.—from L. *amor*, love]: a love affair or intrigue.

AMOY, *ă moy'*: seaport town of China, in a small island of the same name, in the prov. of Fu-kien; lat. 24° 10' n., long. 118° e.; an important commercial emporium of the East. It is divided into an outer and inner town, and has an outer and inner harbor, the entrance to the former of which, as well as the inner town itself, is fortified. A. has been celebrated as a trading town for more than a thousand years, and was one of the earliest seats of European commerce in China. The Portuguese had establishments here in the 16th, and the Dutch in the 17th centuries. In 1841, it was taken by the British; by the treaty of Nanking, a British consul and British subjects were permitted to reside there. The trade is now open to all nations. The chief imports are rice, cotton-twist, British long cloths, beans, peas,



## AMPELITE—AMPÈRE.

etc. The U. S. is the principal export customer of the port, taking annually tea alone to the value of \$4,000,000. The city was pillaged by the Taeping rebels, and during the international military operations in China (1900) was occupied by the Japanese. Pop. over 100,000.

AMPELITE, n. *ăm'pěl-īt* [Gr. *ampēlos*, a vine]: a name applied to alum-slate; a kind of earth.

AMPERE: see ELECTRICAL UNITS.

AMPÈRE, *ăn-pār'*, ANDRÉ MARIE: 1775, Jan. 20—1836, June 10; b. Lyons: distinguished mathematician and naturalist. The death of his father, by the guillotine in 1793, made a deep and melancholy impression on the mind of young A., who sought for solace in the study of nature and antiquity. In 1805, after he had been for some time private mathematical tutor at Lyons, he was called to Paris, where he distinguished himself as an able teacher in the Polytechnic School, and began his career as an author by his essay on the Mathematical Theory of Chances (*Sur la Théorie Mathématique du Jeu*). In 1814, he was elected as a member of the Acad. of Sciences; and in 1824 was appointed Prof. of Experimental Physics in the Collège de France. Scientific progress is largely indebted to A., especially for his electro-dynamic theory and his original views of the identity of electricity and magnetism, as given in his *Recueil d'Observations Electro-dynamiques* (Paris, 1822), and his *Théorie des Phénomènes Electro-dynamiques* (Paris, 1830). These researches prepared the way for the experiments of Dr. Faraday. Several of A.'s writings may be found in the *Annales de Physique et de Chimie*.

AMPÈRE, JEAN JACQUES ANTOINE: 1800, Aug. 12—1864, March 27; b. Lyons; son of André Marie: Prof. of Modern Literature in the Collège de France, at Paris, and member of the French Academy. He acquired a brilliant reputation, on account of the keen and searching character of his manifold literary efforts. After laying the groundwork of his comprehensive studies in Paris, he proceeded to Italy, Germany, and Scandinavia. In 1829, when he returned from his travels, he saw no prospect of becoming a professor in Paris, and so consented to give a course of lectures on the history of literature at Marseilles. After the July revolution, he succeeded Andrieux as prof. in the Collège de France, and also took the place of Villemain in the Norman School. In both chairs he taught with great success. He was especially versed in the knowledge of German literature; and his writings upon China, Persia, India, Egypt, and Nubia, are valuable. Many of his linguistic and historico-literary investigations saw the light first in reviews, especially the *Revue des Deux Mondes*. In 1833, he published an essay on the relations of French literature to that of other countries in the middle ages; in 1841, an *Essay on the Formation of the French Language*—a valuable contribution to philology in general; and in 1850, *Greece, Rome, and Dante*. Many of his papers for periodicals have been collected under the title *Littérature et Voyages* (2 vols., Paris, 1834).

## AMPHI—AMPHIBRACH.

**AMPHI**, *ăm'fī* [Gr.]. a prefix, signifying, on both sides, about; two; used to imply doubt; sometimes changed into **AMBI**.

**AMPHIBIA**, n. plu. *ăm-fīb'ĩă*, or **AMPHIB'IANs**, *-ĩ-ănă* [Gr. *amphi*, both; *bīōs*, life]: animals that can live partly in water, and partly on land—as the seal, walrus, frog, etc.; in *zool.*, restricted to creatures such as the frog and newt, which in early life possess gills, but afterwards acquire lungs instead. **AMPHIB'IAN**, a. *-ĩ-ăn*, or **AMPHIB'IAL**, a. *-ĩ-ăl*, pertaining to. **AMPHIB'IOUS**, a. *ăm-fīb'ĩ-ūs*, able to live partly on land, and partly in water. **AMPHIB'IOUSLY**, ad. *-lĩ*. **AMPHIB'IOUSNESS**, n. *ăm-fīb'ĩ-ūs'nēs*. **AMPHIB' IUM**, n. an amphibian animal; sing. of **AMPHIBIA**.

**AMPHIBIA**: in the Linnæan system of zoology, a class containing Reptiles and Cartilaginous Fishes. The term *amphibious* [Gr., having a double life] had been previously employed, as it still popularly is, to denote animals capable of sustaining existence for a considerable time either on dry land or in water. Of the animals of the Linnæan class, however, some only are capable of this, while some are strictly limited to the one element, and some to the other, and only a very few are truly amphibious, or adapted by the possession of lungs and gills at the same time for breathing either in air or in water. The Linnæan classification was soon altered by the removal of the Cartilaginous Fishes from the class Amphibia, and the name was retained for a class consisting of Reptiles alone—the *Reptilia* of Cuvier. See **REPTILES**. Some recent naturalists have divided this into two classes, *Reptilia* and *Amphibia*, the former having lungs only, the latter having both lungs and gills; the former including the Chelonian, Saurian, and Ophidian Reptiles; the latter only the Batrachian Reptiles, or the former order Batrachia. It must be admitted that these differ from the other orders more than they do from each other. For the position of the A. in a still more recent classification of the Vertebrates, see the table under **ZOOLOGY**: for A. in the narrower sense, see **BATRACHIA**.

**AMPHIBICHNITES**, n. plu. *ăm'fĩ-bĩk'nīts* [Gr. *amphib'ĩă*, animals that can live on land or under water; *ichnĩōn*, a footprint]: in *geol.*, footprints of extinct reptiles.

**AMPHIBLASTIC**, a. *ăm'fĩ-blăst'ĩk* [Gr. *amphi* on both sides, two; *blastos*, a sprout, a bud]: in germinal ova, designating the intermediate series between the discoid or meroblastic, and the vesicular or holoblastic. See **MEROBLASTIC**.

**AMPHIBOLE**, n. *ăm-fīb'ō-lē*, or **AMPHIBOLITE**, n. *ăm-fīb'ō-līt* [Gr. *amphib'ōlōs*, ambiguous or equivocal]: a mineral, a silicate with various protoxide bases; distinguished with difficulty from pyroxene, whence the name: **SYN.** hornblende. **AM'PHIBOL'OGY**, n. *-ōl'ō-jĩ* [Gr. *logos*, speech]: ambiguous or equivocal language; a phrase of doubtful interpretation.

**AMPHIBRACH**, n. *ăm'fĩ-brăk* [Gr. *amphi*, on both sides; *brachus*, short]: in L. and Gr. *poetry*, a foot of three syllables—a short, a long, and a short, thus, — — —; in *Eng. poet.*, used as the end of a line.



## AMPHICARPOUS--AMPHICTYONIC COUNCIL.

AMPHICARPOUS, a. *ăm'fĩ-kâr'pūs* [Gr. *amphi*, both; *karpos*, fruit]: in *bot.*, having two kinds of fruit.

AMPHICÆLOUS, a. *ăm'fĩ-sē'lūs*, or AM'PHICÆ'LIAN, a. *-sē'lĩ-ān* [Gr. *amphikoĩlos*, hollowed all round—from *amphi*, both; *koĩlos*, hollow]: applied to vertebræ which are concave at both ends.

AMPHICTYONIC COUNCIL, *ăm-fĩk'tĩ-ŏn'ĩk-*: a central politico-religious court of several Grecian tribes. There were many amphictyonies in the early days of Greek history—of which by far the most important was the Amphictyony of Delphi. It was held twice a year. In spring, the members assembled in the Temple of Apollo, at Delphi; in autumn, in the Temple of Ceres, at the village of Anthela, near Thermopylæ. The purpose was twofold: 1. To determine questions of international law; 2. To preserve the religious institutions of the Greeks. It is generally supposed that they originated out of a desire for social union, and were, consequently, a result of the national instinct for civilization. Like the Olympic games of a later period, their tendency was to develop a spirit of brotherhood where it was greatly required. The restless Greek intellect, in its application to political life, had naturally an excessive and perilous love of individualism, out of which rose the numerous strifes and animosities of the various states. These councils, on the other hand, were calculated to exert a wholesome centralizing influence. They knit together, for a time, the distracted tribes in a bond of common interest and piety. Like the Olympic games, too, they became the occasion of vast gatherings of the Greek peoples, who crowded thither for every variety of purpose, sacred and secular; and thus a feeling of unity and pure national patriotism was, temporarily at least, excited in the popular mind. The special origin of the A. C. (or League) of Delphi, is unknown, though we know that the League was composed of 12 tribes. The ancient writers differ in the names of these; but the list given by the orator Æschines, though containing only 11, is perhaps the safest to adhere to: the Thessalians, Bœotians, Dorians, Ionians, Perrhæbians, Magnetes, Locrians, Cætæans, Phthiots, Malians, and Phocians. Probably the remaining tribe was the Dolopians, who are mentioned in other accounts. It has been justly concluded that the great preponderance of the northern tribes, who were of the old Pelasgic race, proves the antiquity of the Council. It must have been older than the descent of the Dorians upon the Peloponnesus, or the emigration of the Ionians to the coasts of Asia Minor. Each of the 12 tribes sent to the A. C. two members. These 24 representatives possessed equal authority, although some of the tribes were very small, and hardly independent. They bound themselves by an oath that 'they would destroy no city of the Amphictyons, nor cut off their streams in war or peace; and if any should do so, they would march against him and destroy his cities; and should any pillage the property of the god, or be privy to, or plan anything against what was in his temple at Delphi, they would take vengeance on him with hand, and

## AMPHICTYONS—AMPHIPOLIS.

foot, and voice, and all their might' (Æschines). This excellent oath was very indifferently kept. In the primitive period of Greek history, it probably exerted a beneficial and civilizing influence; but it was only a feeble check to the passions and ambition of a more powerful age. The members at times connived and took part in many outrageous political crimes, and thus violated their oath. By the time of Demosthenes, the A. C. had ceased to command respect; in the 2d c. after Christ, it still existed, but was then on the verge of extinction.

**AMPHICTYONS**, n. plu. *ăm-fík'tĩ-ŏnz* [Gr.]: deputies who came from the different states of ancient Greece to a sacred council.

**AMPHICYON**, n. *ăm-fík'ĩ-ŏn* [Gr. *amphi*, implying doubt; *kũŏn*, a dog]: a fossil carnivorous quadruped.

**AMPHID**, a. *ăm'fĩd* [Gr. *amphi*, both; *eidos*, a form]: consisting of acid and a base.

**AMPHIDISCS**, n. plu. *ăm'fĩ-dĩsks* [Gr. *amphi*, on both sides; *dĩskos*, a quoit or round plate]: the spicula which surround the gemmules of Spongilla, resembling two toothed wheels united by an axle.

**AMPHIGENS**, n. *ăm'fĩ-jěnz* [Gr. *amphi*, *genos*, birth]: plants that increase in size by their growth on all sides, like the lichens.

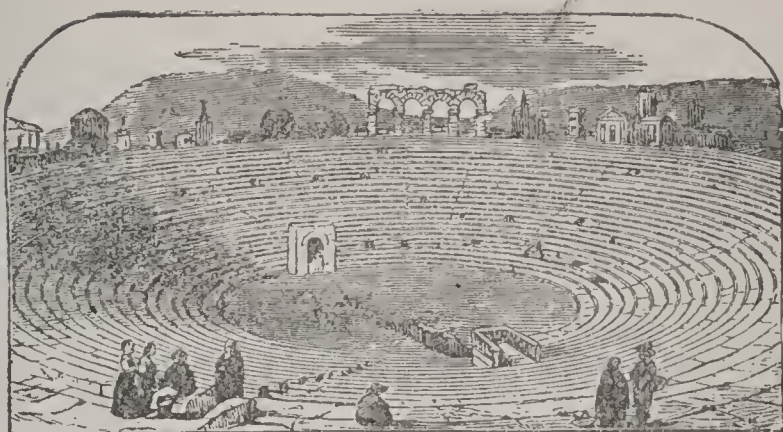
**AMPHIOXUS**, n. *ăm'fĩ-ŏks'ūs* [Gr. *amphi*, on both sides; *oxus*, sharp, pointed]: the lancelet, a little fish which alone constitutes the order Pharyngobranchii—said to be a connecting link between Vertebrates and Invertebrates. See **LANCELET**.

**AMPHIPNEUSTA**, n. plu. *ăm'fĩp-nũs'tă* [Gr. *amphi*, both; *pneusis*, a breathing—from *pněŏ*, I breathe]: the perennibranchiate amphibians which retain their gills through life.

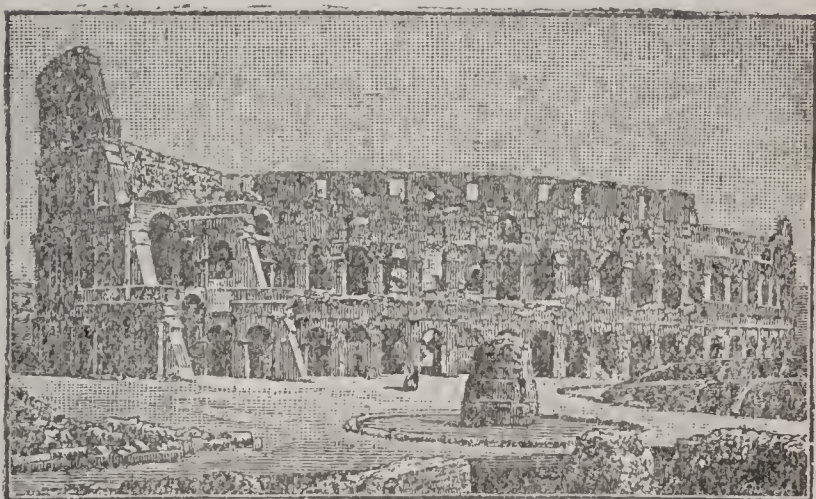
**AMPHIPODA**, n. plu. *ăm'fĩp'ŏ-dă* [Gr. *amphi*, on both sides; *pous* or *poda*, a foot]: an ord. of Crustaceæ which have limbs of two kinds, directed partly forwards and partly backwards, as feet for both walking and swimming. **AMPHIPODOUS**, a. *ăm'fĩp'ŏ-dũs*, having feet of two kinds.

**AMPHIPOLIS**, *ăm'fĩp'ŏ-lĩs*: city of Macedonia; on an island at the mouth of the river Strymon, which flowed almost round the town, whence it derived its name [Gr. *amphi*, around, and *polis*, a city]. In ancient times the position of A. must have been invaluable, as it commanded the only safe entrance from the Strymonic Gulf into the broad Macedonian plains. It belonged originally to the Edonians, a Thracian people, and was called, on account of the roads which met here, Ennea Hodoi (Nine Ways). The first who attempted to colonize it, Aristagoras of Miletus, was cut off with his followers by the Edonians. The Athenians next tried to gain possession of it. Their first army, amounting to 10,000 men, was utterly cut to pieces at Drabescus, B.C. 465, but their second, B.C. 437, under Agnon, son of Nicias, was successful. The Thracians were expelled, and a new city built, to which Agnon gave the

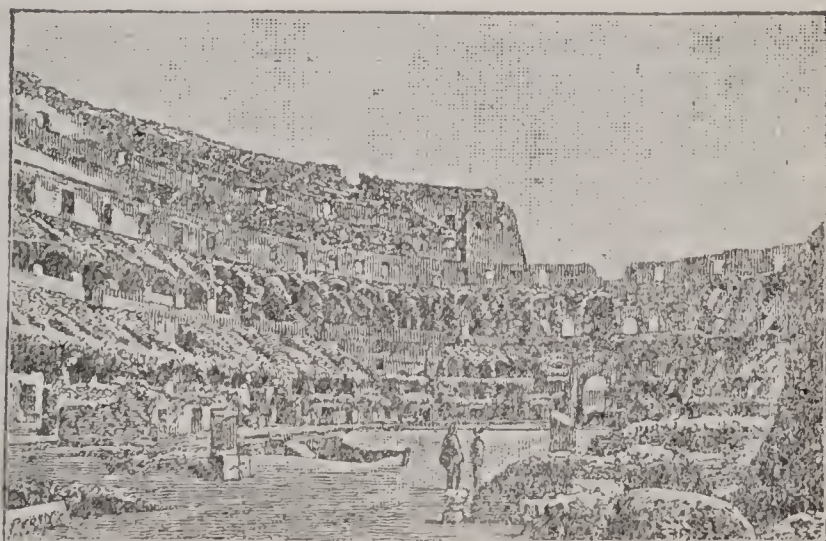




Amphitheatre at Verona.



Amphitheatre.—Colosseum Exterior.



Amphitheatre.—Colosseum Interior.

## AMPHISARCA—AMPHITHEATRE.

name of A. On account of its situation as an emporium for Upper Thrace, and of its neighboring forests of timber for ship-building, A. was an important place. In B.C. 424, it was taken from the Athenians by the Spartan Brasidas, was restored to Athens by the Antalcidean treaty of peace, and afterwards was taken by Philip of Macedon. Under the Romans it was made the capital of East Macedonia. In the middle ages it was called Popolia. Its site is now occupied by a Turkish town, but a few of its ruins are still visible.

AMPHISARCA, n. *ăm'fĩ-sár'kă* [Gr. *amphi*, on both sides; *sarx* or *sarka*, flesh]: in *bot.*, a particular kind of fruit with a hard exterior, and pulp round the seeds, as in the Baobab.

AMPHISBÆNA, n. *ăm'fĩs-bē'nă* [Gr. *amphisbai'na*—from *amphi*, *baino*, I go]: a kind of serpent, supposed, from the thickness of the tail, to have two heads, and apparently able to move forward with either; in *zool.*, a S. Amer. genus of snake-like lizards.

AMPHISCII, n. plu. *ăm-fĩsh'ĩ-ĩ*, or AMPHISCIANS, *ăm-fĩsh'ĩ-ănz* [Gr. *amphi*, on both sides; *skia*, a shadow]: persons living between the tropics, whose shadows, fall both ways—that is, northward one half of the year, and southward during the other.

AMPHITHEATRE, n. *ăm'fĩ-thē'ă-tēr* [Gr. *amphi*, on both sides; *theātron*, a place for seeing, a theatre]: among anc. Grs. and Roms., a large circular building where plays and games were publicly exhibited, with seats gradually rising one behind the other; ground rising on more than one side from a level; a part of a theatre or circus. AM'PHITHEAT'RICAL, a. *-thē-ăt'ri-kăl*, pertaining to an amphitheatre.

AMPHITHEATRE: a spacious building, generally elliptical in form, used by the Romans for exhibiting gladiatorial combats, fights of wild beasts, and other spectacles. The A. differed from a theatre for dramatic performances (*theatrum*) in this, that whereas the theatre had only a semicircle of seats fronting the stage, the A. was entirely surrounded by them; and hence the name of Amphitheatre [Gr. *amphi*, on both sides, or, all round]. Till a late period at Rome, these erections were of wood, and merely temporary, like a modern race-stand. They seem, however, to have been of enormous size, as Tacitus mentions one, during the reign of Tiberius, which gave way, and caused the death or injury of 50,000 spectators. Amphitheatres of stone had begun, however, to be erected at an earlier period than this, the first having been built at the desire of Augustus. The Flavian A. at Rome, known as the Colosseum, which was begun by Vespasian, and finished by Titus, A.D. 80, ten years after the destruction of Jerusalem, was probably the largest structure of the kind, and is fortunately also the best preserved. It covers about five acres of ground, and was capable of containing 87,000 persons. Its greatest length is 620 ft., and its greatest breadth 513. On the occasion of its dedication by Titus, 5,000 wild beasts were slain in the



## AMPHITRITÉ.

arena, the games having lasted for nearly 100 days. The exterior is about 160 ft. in height, and consists of three rows of columns, Doric, Ionic, and Corinthian, and, above all, a row of Corinthian pilasters. Between the columns there are arches, which form open galleries throughout the whole building; and between each alternate pilaster of the upper tier there is a window. There were four tiers or stories of seats, corresponding to the four external stories. The first of these is supposed to have contained twenty-four rows of



Colosseum.

seats; and the second, sixteen. These were separated by a lofty wall from the third story, which is supposed to have contained the populace. The *podium* was a kind of covered gallery surrounding the arena, in which the emperor, the senators, and vestal virgins had their seats. The building was covered by a temporary awning or wooden roof, called *velarium*, the mode of adjusting and fastening which has given rise to many antiquarian conjectures. The open space in the centre of the A. was called *arena*, the Latin word for sand, because it was covered with sand or sawdust during the performances. The taste for the excitement of the A. which existed at Rome naturally spread to the provinces, and large amphitheatres were erected not only in the provincial towns of Italy, as at Capua, Verona, Pompeii, etc., but also at Arles and Nismes, in France; and even in Britain, at Cirencester, Silchester, and Dorchester.

AMPHITRITÉ, *ăm-fĩ-trĩ'tē*: in Mythology, daughter of the sea-god Nereus and of Doris—or, according to Apollodorus, of a daughter of Oceanus; the wife of Neptune. When the latter demanded her in marriage, she fled to Mount Atlas, but was discovered by a dolphin, which Neptune had sent after her, and borne back to him. As god

## AMPHITROPAL—AMPLE.

less and queen of the sea, she is represented with her husband's trident in her hand, sitting in a car of shells drawn by Tritons, or on a dolphin, before which a Cupid swims.

**AMPHITROPAL**, a. *ăm-fĩ't'rō-pāl* [Gr. *amphi*, around; *tropē*, a turning]: in *bot.*, applied to an embryo so much curved that both ends are brought close together and turned towards the hilum.

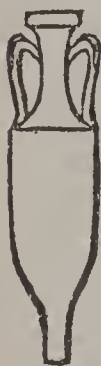
**AMPHIUMA**, *ăm-fĩ-ũ'mă*: a curious genus of *Batrachia*, having an eel-like form, a large head, thick and extensile



Amphiuma means.

lips, depressed and rounded snout; the neck contracted, with a transverse fold at the throat; numerous small teeth on the maxillary and palate bones, a single spiracle on each side of the neck; four legs, all very small and two-toed. *A. means* is found in the s. and s.w. parts of the United States. It attains a length of more than two ft., and is of a bluish-black color. It lives in muddy water or in mud, burrowing like a worm in the ditches of rice-fields, and feeds on small fish, mollusks, and insects. It is regarded by the negroes as highly venomous, but there is no reason for the notion.

**AMPHORA**, n. *ăm'fō-ră* [L.—from Gr. *amphi*, on both sides; *phorein*, to bear]: an anc. two-handed earthen vessel for holding wine, oil, etc. Among the Greeks and Romans, a large vessel, usually made of clay, shaped like our pitchers, with a narrow neck and two handles, and often ending in a sharp point below, for being inserted in a stand or in the ground. Several of this sort, and in an upright position, have been found in the cellars at Pompeii. The A. was chiefly used for the preservation of various liquids, especially wine, the age of which was marked on tickets affixed to the vessel. There is also evidence that amphoræ were employed as cinerary urns and as coffins. The A. among the ancients was likewise a measure for liquids. In Greece, it contained about nine English gallons; the Roman amphora contained only two-thirds as much. In modern times, *Anfora* is the name of a wine-measure in Venice.



Amphora.

**AMPLE**, a. *ăm'pl* [F. *ample*—from L. *amplus*, large]: large; wide; liberal; more than sufficient; extended; spa-



## AMPLEXICAUL—AMPULLA.

**ci**ous. **AM'PLY**, ad. *-plī*, largely; liberally; abundantly. **AMPLENESS**, n. *ām'pl-nēs*, largeness; sufficiency in space. **AMPLIATIVE**, a. *ām'plī-āt'iv*, adding to that which is already known or received. **AMPLIFY**, v. *ām'plī-fī* [L. *fīdō*, I am made]: to increase; to enlarge; to add many words. **AM'PLIFY'ING**, imp. **AM'PLIFIED**, pp. *-fīd*. **AMPLIFICATION**, n. *ām'plī-fī-kā'shūn* [F.]: the act of enlarging; enlargement; the addition of many words. **AM'PLIFIER**, n. one who. **AMPLITUDE**, n. *ām'plī-tūd* [F.—L.]: largeness or extent of anything; abundance; the vertical extent of a wave from trough to crest.—**SYN.** of 'ample': spacious; capacious; abundant; plenteous; large; wide; extended; big; unrestricted; rich; munificent; liberal; sufficient; full; extensive; plentiful; copious.

**AMPLEXICAUL**, a. *ām-plēks'ī-kawl* [L. *amplector*, I embrace; *caulis*, the stem]: in *bot.*, embracing the stem over a large part of its circumference, as the base of a leaf.

**AMPLIFICATION**: a term in Rhetoric, meaning that an idea, an opinion, or an inference is presented to the mind, accompanied by accessory circumstances. Its aim is to produce a powerful and vivid impression through the instrumentality of epithets, particulars, or other methods of elaboration. Rhetorical A. is generally produced—1st, by similitude; 2d, by contrast; 3d, by illustrating the universal in the particular; 4th, by piling up logical arguments. *Exaggeration* is an illegitimate kind of A., the result of an undue enlargement of particular facts and circumstances.

**AMPLITUDE**, in Astronomy: distance of a heavenly body, at the time of its rising or setting, from the e. or the w. point of the horizon. When the sun is in the equator (i.e., at the time of either equinox), it rises exactly e., and sets exactly w., and therefore has no A. Its A. is at its maximum at midsummer, and again at midwinter; and that maximum depends upon the latitude of the place, being  $23\frac{1}{2}^{\circ}$  at the equator, and increasing to the Arctic circle, where it becomes  $90^{\circ}$ . The A. of a fixed star remains constant all the year round.

**AMPULLA**, n. *ām-pŭll'ă* [L.]: among the ancients, a flask or bottle swelling out in the middle; in *bot.*, a hollow leaf. **AMPULLACEOUS**, a. *ām'pŭl-lā'shŭs*, in *bot.*, swollen out in the middle like a bottle or bladder.

**AMPULLA**: a kind of bottle, used by the Romans for the preservation of liquids; made either of earthenware or glass, and sometimes, though very rarely, of more costly materials. Great numbers of such vessels have found their way into collections of antiquities. They are generally 'bellied,' i.e., approaching to globular, narrowing towards the mouth, and provided with two handles. They are frequently mentioned in connection with the baths of ancient times. The *A. olearia* was a 'bottle of oil' which the Roman took with him when he went to the bath, and with which he anointed himself after his ablutions. Sometimes the oils were perfumed.



Ampullæ.

## AMPUTATE—AMPUTATION.

The *A. Remensis* (the holy vessel, Fr. *la sainte ampoule*) was the name of that famous vessel in which was contained the unguent (believed to have been brought by a dove from heaven) that anointed Clovis, king of the Franks, at Rheims, 496, and with which every succeeding monarch of France, down to Louis XVI., was anointed at his coronation. The *A. Remensis* was shattered, with a great many more valuable things, at the revolution of 1789; but a fragment of it was preserved by some devout royalist, and handed over at the Restoration to the Archbishop of Rheims. Curious to say, a little of the miraculous substance still remained, which was mixed up with oil, and used to anoint Charles X. in 1825.

AMPUTATE, v. *ăm'pū-tāt* [L. *amputātus*, cut off—from *am*, round about; *puto*, I prune]: to take off by cutting round about; to cut off an arm or a leg; to prune. AM-PUTA'TING, imp. AM'PUTA'TED, pp. AM'PUTA'TION, n. -*shūn*, the act of cutting off a leg, or a part of a body; the act of pruning.

AMPUTATION: the cutting off of a part which, by its diseased condition, endangers, or may endanger, the safety of the whole body. The *A.* of a limb was in ancient times attended with great danger of the patient's dying during its performance, as surgeons had no efficient means of restraining the bleeding. They rarely ventured to remove a large portion of a limb, and when they did so, they cut in the gangrened parts, where they knew the vessels would not bleed; the smaller limbs they chopped off with a mallet and chisel; and in both cases had hot irons at hand with which to sear the raw surfaces, boiling oil in which to dip the stump, and various resins, mosses, and fungi, supposed to possess the power of arresting hemorrhage. Some tightly bandaged the limbs they wished to remove, so that they mortified and dropped off; and others amputated with red-hot knives, or knives made of wood or horn dipped in vitriol. The desired power of controlling the hemorrhage was obtained by the invention of the tourniquet (q. v.) in 1674 by a French surgeon, Morell. The ancient surgeons endeavored to save a covering of the skin for the stump, by having the skin drawn upwards by an assistant, previously to using the knife. In 1679, Lowdham of Exeter suggested cutting semicircular flaps on one or both sides of a limb, so as to preserve a fleshy cushion to cover the end of the bone. Both these methods are now in use, and are now known as the 'circular' and the 'flap' operations; the latter is most frequent.

A 'flap' amputation is performed thus: The patient being placed in the most convenient position, an assistant compresses the main artery of the limb with his thumb, or a tourniquet is adjusted over it. Another assistant supports the limb. The surgeon with one hand lifts the tissues from the bone, and transfixing them with a long narrow knife, cuts rapidly downwards and towards the surface of the skin, forming a flap; he then repeats this on the other side of the limb. An assistant now draws up these flaps, and the



knife is carried round the bone, dividing any flesh still adhering to it. The surgeon now saws the bone. He then, with a small forceps, seizes the end of the main artery, and drawing it slightly from the tissues, an assistant ties it. All the vessels being secured, the flaps are stitched together with a needle and suture dressed antiseptically.

The tourniquet has been almost entirely superseded by the 'bloodless method of Prof. Esmarch,' which consists in winding an elastic bandage round the limb, beginning at the fingers or toes, and extending upward beyond the site of operation. The bandage is applied firmly, with the effect of driving all blood from the limb. An elastic tube or strap is then tied several times round the limb at the point where the bandage ends, and the bandage is removed. The operation is then performed with shedding only a few drops of blood. The vessels are ligated and the strap removed; and if it is evident that all divided vessels are occluded, the flaps are closed. Antiseptic precautions are indispensable during the operation and in dressing the wound. See ASEPSIS: ANTISEPTIC: DISINFECTANTS: CARBOLIC ACID: GERM THEORY: ETC.

AMRITSAR, *âm-rî't sâr* (*Umritsar*): city of the Punjab, India; 32 m. e. of Lahore, by rail; cap. of a dist., also of a division. It is the religious metropolis, and on an islet in its 'pool of immortality' stands the chief temple of the Sikh faith. A. is a favorite resort of pilgrims. Next to Delhi, it is the richest and most prosperous city in n. India, having considerable manufactures and much trade. Pop. (1901) 162,429.

The district of A. has 1,574 sq. m.; pop. over 900,000. The division of A. has 5,354 sq. m.; pop. 2,729,109.

AMSLER, *âms'lër*, SAMUEL: 1791, Dec. 17—1849, May 18; b. Schinznach, Switzerland: engraver on copper, and prof. in the Acad. of Arts, Munich. Among his great works, showing the highest qualities of imitative art, are his engraving of *Alexander's Triumphant Procession*, by Thorwaldsen; *Burial of Christ*, by Raphael; and engraving of a statue of Christ, by Dannecker. His style is marked by noble treatment of form, rather than by strong contrast of tones. In faithful representation of Raphael's works, A. is scarcely equalled.

AMSTERDAM, *âm'stër-dă'm*: city in Montgomery co., N. Y.: on the n. side of the Mohawk river, 33 m. w. of Albany; on the N. Y. Central and West Shore r.r., and the Erie canal. It was incorporated 1885. Among its important manufacturing establishments are planing mills, machine shops and foundries, carriage-spring factories, dye works, and factories for paper boxes, brooms, carpets, knit goods, linseed oil, etc. There are three national, one private, and one savings bank, three daily and five weekly newspapers. A. has fine water and sewerage systems.—Pop. (1880) 11,710; (1890) 17,336; (1900) 20,929.

## AMSTERDAM.

AMSTERDAM, *ăm'-stēr-dăm'*, or AMSTELDAM [the dam or dike of the Amstel]: chief city of the Netherlands, at the confluence of the Amstel with the Ij (pronounced *eye*), an arm of the Zuyder Zee. It is divided by the Amstel, and numerous canals, into small islands, connected by about 300 bridges. Almost the whole city, which extends in the shape of a crescent, is founded on piles. At the beginning of the 13th c., it was merely a fishing village, with a small castle, the residence of the Lords of Amstel. In 1296, on account of the murder of Count Floris of Holland, the rising town was demolished, and its inhabitants were compelled to leave it. Afterwards, with Amstelland (the district on the banks of the Amstel), it was taken under the protection of the Counts of Holland, and under them enjoyed several privileges which contributed to its subsequent prosperity. In 1482, it was walled and fortified. It soon rose to be the first commercial place in the united states of the Netherlands; in 1585, was considerably enlarged by the building of the new town on the west; and in 1622 had 100,000 inhabitants. This prosperity excited the envy of its neighbors. In the 17th c., the war with England so far reduced the commerce of A., that, in 1653, about 4,000 houses were uninhabited. Prosperity was restored during the next century, and, though commerce was again injured by the disputes with England, 1781-82, it once more revived. The union of Holland with France in 1840 entirely destroyed the foreign trade of A., while the excise and other new regulations impoverished its inland resources; but the old firms lived through the time of difficulty, and in 1815 commerce again began to expand.

The city has a fine appearance, when seen from the harbor, or from the high bridge over the Amstel. Numerous church towers and spires relieve the flatness of the prospect. The old ramparts have been levelled, planted with trees, and formed into promenades. Between 1866 and 1876, many spacious streets and an extensive public park were added to the city. Tramways have been successfully introduced, and the harbor greatly improved. There is railway communication with all parts of the country and of Europe. Rich grassy meadows surround the city. On the w. side are a great number of windmills for grinding corn and sawing wood. The three principal canals in A., on each side of which, with a carriage-way and row of trees intervening, the gentlemen's residences are built, run in semicircles within each other, and are from 2 to 3 m. long, called the Heeren-gracht, Keizersgracht, and Princengracht. The houses are built of brick, and have their gables towards the streets, which gives them a picturesque appearance. In old times, A. was strongly fortified; now its only defense consists in the sluices, several miles distant from the city, which can flood, in a few hours, the surrounding land. A hard frost, however, like that of 1794-95, when Pichegru invaded the country, would render this means of defense useless. The chief industrial establishments are sugar refineries, engineering works, mills for polishing diamonds and other precious



## AMSTERDAM.

stones, dockyards, manufactories of sails, ropes, tobacco silks, gold and silver plate and jewelry, colors and chemical preparations, breweries, distilleries, with export houses for corn and colonial produce; cotton-spinning, book-printing, and type-founding are also carried on. Income of the city (1875), £496,929; expenditure, £450,127; debt, £3,518,526. The ships which cleared inward were 1,020; outward, 1,040. The former *Stadhuis*, converted into a palace for King Louis Bonaparte, and still retained by the reigning family, is a noble structure raised upon 13,659 piles, and is 290 ft. in length, by 239 ft. in breadth, surmounted by a round tower, rising 190 ft. from the base. It has a hall, 120 ft long, 57 ft. wide, and 90 ft. high, lined with white Italian marble—an apartment of great splendor.

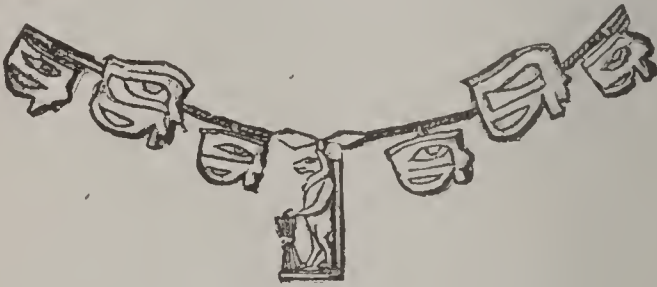
The *Nieuwe Kerk* (New Church), founded 1408, is the finest ecclesiastical structure in the city. Its chancel is especially admired. It contains the tombs of Admiral de Ruyter, of the famous Dutch poet Vondel, and of various other notable persons. The Old Church (*Oude Kerk*), built in the 14th c., contains several monuments of naval heroes. Literature and science are represented by a university supported by the municipality (till recently known as the *Athenæum illustre*), by an Academy of Arts and Sciences, an excellent Museum of paintings, a library, harmonic societies, a botanical and a zoological garden. There are several theatres. The hospital for aged people, the poor-house, house of correction, the orphan asylums, a navigation school, and many benevolent societies, are well supported, and well managed. Large ships reach the city by the North Holland canal (52 m. in length) from Nieuwe Diep, but, if drawing more than 15½ ft. of water, must first discharge a large part of the cargo. To avoid this delay and expense, the IJ has been separated from the Zuyder Zee by a sea-dike, with sluices for admitting the small inland ships, and pumping-machinery capable of discharging 2,500 cubic metres of water per minute. Two piers have been built into the North Sea, near Wijk aan Zee, to form a harbor. The peninsula has been cut by a canal which is continued through the IJ, and capable of admitting vessels drawing 22 ft. direct to A., reducing also the distance from 52 to 15 m., the length of the new canal. In carrying out these works, about 12,000 acres of excellent land have been reclaimed from the IJ, and in 1876 a large tract was already bearing fine crops. Pop. (1901, Dec. 31) 530,718, the majority of whom belonged to the Dutch Reformed Church; of the remainder, the most numerous are the Roman Catholics, Lutherans, Jews, and Baptists.

AMSTERDAM. barren islet, lat. 37° 52' s., and long. 77° 37' e., the home of sea-birds, shell-fish, and seals. It is worthy, however, of notice for its structure and its situation. Manifestly of volcanic origin, it still possesses a burning soil and hot springs; and with its single neighbor, St. Paul, 60 m. to the n.e., it is about midway in the direct line between the Cape of Good Hope and Van Diemen's Land, being also at nearly the same distance from Cape Comorin.

AMU, or AMU DARIA, or JEHUN: see OXUS.

AMUCK, ad. *ă-mŭk'* [Malay, *amok!* kill!]: wildly; madly; killing people without discrimination, after the manner of a Malay; as, *to run amuck*.

AMULET, n. *ăm'ŭ-lĕt* [F. *amulette*—from L. *amulĕtum*, a charm: Ar. *hamalat*, anything worn, as a sword-belt—from *hamala*, to carry]: a preservative against sickness, poison, etc.; something worn, generally around the neck, in the belief that it will ward off disease, witchcraft, or evil. AM'ULET'IC, a. *-ĭk*, pert. to. An A. is often a stone, or piece of metal, with an inscription or some figures engraved on it. Its origin, like its name, seems oriental. The ancient Egyptians had their amulets, sometimes forming necklaces.



Egyptian Amulet.

Among the Greeks, such a protective charm was styled *phylacterion*; among the Romans, *amuletum*. The phylacteries of the Jews (see Matt. xxiii. 5), slips of parchment on which passages of the Law were written, were evidently worn as badges of piety by the Pharisees; but were also regarded as wholesome preservatives from evil spirits, and from all manner of harm. From the heathen, the use of amulets passed into the Christian church, the inscription on them being *ichthus* (the Greek word for a fish), because it contained the initials of the Greek words for Jesus Christ, Son of God, Saviour. See ABBREVIATIONS. Among the Gnostic sects, Abraxas stones (q.v.) were much used. Amulets soon became so common among Christians that in the 4th c. the clergy were interdicted from making and selling them on pain of deprivation of holy orders; and in 721, the wearing of amulets was solemnly condemned by the church. Among the Turks and many other nations of Central Asia, every person considers it necessary to wear a preservative charm. With the spread of Arabian astronomy, the astrological A. or talisman (q.v.) of the Arabs found its way to Europe. Kopp, a German author, has written a work, *Palæographica Critica*, on amulets and their inscriptions. Among amulets in repute in the middle ages were the coins attributed to St. Helena, the mother of Constantine. These and other coins marked with a cross were thought specially efficacious against epilepsy, and are generally found perforated, for the purpose of being worn suspended from the neck.—The belief in the virtue of amulets is not extinct among the vulgar.

AMURCOUS, a. *ă-mér'kŭs* [L. *amur'ca*—from Gr.

## AMURNATH—AMYGDALEÆ.

*amor'gē*, the refuse of expressed olives]: full of lees or scum. AM'URCOS'ITY, n. -kōs'ī-tī.

AMURNATH, *ā-mōr-nath'*: a cave amid the mountains which bound Cashmere on the n.e. It is a natural cave in a rock of gypsum, about 100 yards wide, 30 high, and 500 deep. It is believed by the Hindus to be the residence of the god Siva, and is therefore visited by multitudes of pilgrims. It is inhabited by vast numbers of doves, which fly out in alarm on the loud shouting of prayers by the pilgrims, and this is supposed to indicate the acceptance of their prayers.

AMUSE, v. *ā mūz'* [F. *amuser*, to detain, to divert: Gr. *a*, without; *muzō*, I murmur or mutter to express displeasure]: to entertain agreeably; to fill the mind with thoughts which engage without distracting it. AMU'SING, imp.: ADJ. pleasing; also AMU'SIVE, a. -zīv. entertaining. AMUSED, pp. *ā-mūzd'*. AMU'SER, n. one who. AMUSE'MENT, n. [F. *amusement*]: that which diverts; that which entertains pleasantly. AMU'SINGLY, ad. -lī, or AMU'SIVELY, ad. -zīv-lī, in an amusing manner. SYN. of 'amuse': to entertain; divert; beguile; occupy; deceive; please; gratify;—of 'amusement': diversion; entertainment; sport; recreation; pastime.

AMYCLÆ, *ā-mī'klē*: old Laconian town, on the e. bank of the Eurotas, 20 stadia s.e. of Sparta, in a richly-wooded and fertile region. It was a famous city in the heroic age, the abode of Tyndarus and his spouse Leda, who bore to Jupiter the twins, Castor and Pollux (called *Amyclæi Fratres*, the Amyclæan brothers), and Helena. Long after the Dorians had subjugated and peopled the rest of the Peloponnesus, A. continued to be a free Achæan town. It was conquered by the Spartans only before the first Messenian war, and in consequence of a curious and absurd law. The inhabitants were so often agitated by false rumors of the approach of the Spartans that, growing tired of living in a state of continual alarm, they decreed that no one should henceforth mention or even take notice of these disagreeable fictions. Unfortunately, the Spartans *did* come at length, and, according to the Greek saying, 'A. perished through silence.' Hence the proverb, *Amyclis ipsis taciturnior* (More silent than A. itself). After its conquest, A. became a village, noted only for its annual festival of the Hyacinthia, and its temple of Apollo, with the colossal statue of the god himself.

AMYCLÆ: an ancient city on the coast of Campania, Italy, said to have been built by a colony from the Greek A. It had ceased to exist in the time of Pliny.

AMYGDALEÆ, *ā-mīg-dāl'ē-ē*, or DRUPACEÆ, *drū-pā'sē-ē*: according to some botanists, a natural order of dicotyledonous plants; but more generally regarded as a sub-order of ROSACEÆ. The species all are trees or shrubs. They have the tube of the calyx lined with a disk, the pistil a solitary simple carpel with a terminal style, the fruit a drupe. For other botanical characters, see ROSACEÆ. The bark yields



## AMYGDALIN—AMYGDALOID.

gum, and hydrocyanic acid is present in very notable quantity in different parts, as the leaves, kernels, etc. The A. are chiefly natives of the cold and temperate regions of the northern hemisphere. Some of them yield valuable fruits; and various products of the order are used in medicine. See ALMOND: PEACH: NECTARINE: PLUM: CHERRY: and CHERRY LAUREL. This order or sub-order contains about 110 known species.

AMYGDALIN, *ă-mĭg'dă-lĭn* ( $C_{20}H_{27}NO_{11} \cdot 3H_2O$ ): a crystalline principle in the kernel of bitter almonds, the leaves of the *Prunus lauro cerasus*, and various other plants, which by distillation yield hydrocyanic acid. It is obtained, by extraction with boiling alcohol, from the paste or cake of bitter almonds, which remains after the fixed oil has been separated by pressure. The alcoholic solution usually contains more or less oil, which must be removed by decantation or filtration; it must then be evaporated till a syrup is left, which must be diluted with water, mixed with yeast, and set aside to ferment, for riddance of any sugar that may be present: on now filtering and evaporating, the A. crystallizes in thin transparent needle-like prisms. It has a sweetish, somewhat bitter taste, and is not poisonous, and when treated with alkaline solvents, ammonia is expelled, and amygdalic acid,  $C_{20}H_{26}O_{12}$ , is produced. Its most remarkable change is, however, that which is noticed in the article ALMONDS, VOLATILE OIL OF, and which may be thus briefly stated. When the bruised almond kernel, or almond paste, is brought in contact with water, the peculiar odor of bitter almonds is almost immediately evolved; and in 24 hours all traces of amygdalin will have disappeared, its place being taken by essential oil of almonds, hydrocyanic acid, sugar, and formic acid. This transformation is due to the presence of a peculiar nitrogenous matter called emulsin (q.v), or synaptase, which sets up a kind of fermentation. As the proportion of hydrocyanic acid which is liberated by the above reaction is fixed, Liebig and Wöhler recommend that A. should be employed in preparing that acid for medicinal purposes. A. may be dissolved in water for any length of time without undergoing change; but if it be mixed with an emulsion of sweet almonds, immediate decomposition ensues. Seventeen grains of A., when dissolved in an ounce of emulsion of sweet almonds, furnish exactly one grain of pure hydrocyanic acid, which may be readily diluted to the strength of the pharmacopœial acid.

AMYGDALOID, n. *ă-mĭg'dă-loyd* [Gr. *amug'dalon*, an almond; *eidos*, appearance]: applied to certain igneous rocks containing small almond-shaped cavities filled with agate, jasper, and other minerals, having the appearance of almonds in a cake. AMYG'DALOID'AL, a. pertaining to. AMYGDALATE, a. *ă-mĭg'dăl-ăt*, made of almonds: N. milk of almonds. AMYGDALIC, a. *ăm'ĭg-dăl'ĭk*, pertaining to. AMYG'DALINE, n. *dă-lĭn*, a crystalline substance obtained from almonds: ADJ. pertaining to; also AMYG DALIN'IC, a. *-lĭn'ĭk*.

AMYGDALOID: a rock, consisting of a basis of some

kind of trap rock, very frequently of greenstone, forming numerous roundish or oval cells, which are filled with nodules, often of calcareous spar or of zeolitic minerals. The cells are not large, but even those which are almost adjacent differ much in size. The nodules are evidently the result of a sublimation and imperfect crystallization, under the action of the heat which formed the cells. Empty cells often occur among those filled with minerals. The name A. is correctly extended to rocks of the same character, although the basis be not of trap, but metamorphic.

AMYL, n. *ām'il* [L. *am'ylum*: Gr. *am'ulon*, starch—from Gr. *a*, priv.; *mulē*, mill]: in *chem.*, hypothetical radical of the amyl series. AMYLENE, n. *ām'i-lēn*, a hydrocarbon,  $C_5H_{10}$ , of the ethylene series. AMYLIC, a. *ām'il'ik*, of or from starch. AMYLACEOUS, a. *ām'il-ā'shūs*, starchy. AMYLOID, a. *ām'il-oyd*, starch-like. AMYLIC ALCOHOL, fusel oil (q.v.). —*Amyl*,  $C_5H_{10}$ , is one of a series of alcohol radicals having the general formula  $C_nH_{2n+1}$ : found in amyl alcohol or fusel oil; obtained by heating amyl iodide with a zinc amalgam in a closed tube at  $350^\circ F.$ : a colorless liquid, sp. grav. 32, boiling point  $311^\circ F.$ , possessing a somewhat aromatic odor; it exerts a dextro-rotatory action on a ray of polarized light. It enters into a large number of chemical compounds, most of which—e.g., bromide, chloride, iodide, etc.—are derived from amylic alcohol, which bears to A. the same relation that ordinary alcohol bears to ethyl,  $C_2H_5$ . AMYL NITRITE,  $C_5H_{11}NO_2$ , is a clear yellowish fluid, highly volatile, with odor as of ripe bananas. As a remedy for asthma and angina pectoris it is administered by inhalation. It causes great vascular dilatation and increases the heart's action. Usually it is put up in 'pearls' (glass capsules) containing 3–5 drops. One of the pearls is put in a handkerchief and then broken, and the patient inhales the vapor. Its value is in its rapid action, giving relief till remedies of more permanent but tardier effect can act. It should be used only under medical advice.

AMYLACEOUS, *ām'il-ā'shūs*: a term in Chemistry and Botany, equivalent to starchy.—A. *food* is food consisting at least in great part of some kind of starch, as arrow-root, sago, etc.—A compound radical called *amyle* is formed by the decomposition of starch in a peculiar fermentation—the *amylic fermentation*—but to it the term A. has no reference.

AMYLIC ALCOHOL: see FUSEL OIL.

AMYOT, or AMIOT, *ā'me-o'*, JACQUES: 1513-93; a French writer, well known by his excellent translations of the Greek classics. The version of Plutarch is one of his best translations, and has passed through several editions.

AMYRIDACEÆ, *ām'ir'ī dā'sē-ē*: a natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, natives of tropical countries, remarkable for the abundance of their fragrant balsamic or resinous juice. They have compound leaves, occasionally with stipules and pel-



## AN—ANABAPTIST.

acid dots. The flowers are in racemes or panicles, the calyx persistent, with 2-5 divisions; the petals are 3-5; aestivation valvate or imbricated. The stamens are twice or four times as many as the petals. The ovary is superior, sessile, 1-5-celled, inserted in a large disk; the style solitary and compound, or wanting; the stigmas as many as the cells of the ovary; the ovules in pairs, anatropal. The fruit is hard and dry, 1-5-celled, its outer rind often splitting into valves. The seeds are exalbuminous. About forty or fifty species are referred to the order; but many of them are still very imperfectly known. Some species afford valuable timber; but the principal products of the order are fragrant resins and balsams, as MYRRH (q.v.), and different kinds of FRANKINCENSE (q.v.), OLIBANUM (q.v.), ELEMI (q.v.), BDELLIUM (q.v.), TACAMAHAC (q.v.), BALSAM OF GILEAD (q.v.), etc. Among the more important genera of the order may be named *Amyris*, *Balsamodendron*, *Boswellia*, and *Iceia*.—*Canarium commune*, a native of Java, which yields a gum similar in its properties to the BALSAM OF COPAIVA (q.v.), produces also triangular nuts, which are eaten both raw and dressed, and from which an oil is extracted for the table and for burning. *Balanites Egyptiaca* is cultivated in Egypt for its fruit, a drupe, which is eaten, and from the seeds of which a fat oil is expressed, called *Zachun*.

AN, *ăn* [AS. *an*; Scot. *ane*; Dut. *een*; Dan. *en*, one]: denoting a single individual, but less emphatic than *one*; the indefinite article, put before nouns or adjs. in the sing. beginning with a vowel or the sound of a vowel—as, *an* egg, *an* honorable man.

AN, conj. *ăn* [AS.]: in OE., if. AN IF, even if. AN'T, if it.

ANA, *ăn'ă*, also sometimes contr. AN [Gr. *ana*]: a *prefix*, signifying up; through; among; back; again; in composition, similar to; according to: as a *postfix*, signifying a collection of memorable sayings or loose thoughts—as *Johnsoniana*: in *med.*, prescriptions denoting a repetition, or, of each. AN'A, n. a collection of sayings, anecdotes, etc., of a person of note; the anecdotes or gossip of a place. Such titles were first used in France (relating to persons), where they became common after the publication of *Scaligerana* by the brothers Dupuy (Hague, 1666). An approximately complete catalogue of works with such titles may be found in Namur's *Bibliographie des Ouvrages publiés sous le Nom d'Ana* (Brussels, 1839).

ANABAPTIST, n. *ăn'ă-băp'tist* [Gr. *ana*, *baptizo*, I dip under water]: one who rejects infant baptism and baptizes again those who have been baptized in infancy. AN'ABAPTISTS, a religious sect holding this belief. AN'ABAPTISTIC, a. *-tik*, of or pertaining to. AN'ABAPTISM, n. *-tizm*, the doctrine of the anabaptists.—See ANABAPTISTS,

## ANABAPTISTS.

**ANABAPTISTS:** term applied generally to those Christians who reject infant baptism, and administer the right only to adults; so that when a new member joins them, whose baptism does not accord with their views of Scripture (which usually involve, also, the necessity of immersion), he or she is baptized a second time, the first being considered no baptism. The name, thus due to an accidental circumstance, is disclaimed by the more recent opponents of infant baptism.

The origin of the sect cannot be distinctly traced; but is manifestly connected with the controversy about infant baptism carried on in the early church. Opposition to this doctrine was kept alive in the various so-called heretical sects that went by the general name of Cathari (i.e., purists), such as the Waldenses, Albigenses, etc. Shortly after the beginning of the Reformation, the opposition to infant baptism appeared anew, especially among a set of fanatical enthusiasts called the Prophets of Zwickau, in Saxony, at whose head were Thomas Münzer (q.v.) (1520) and others. Münzer went to Waldshut, on the borders of Switzerland, which soon became a chief seat of anabaptism, and a centre whence visionaries and fanatics spread over Switzerland. They pretended to new revelations, dreamed of the establishment of the kingdom of heaven on earth, and summoned princes to join them, on pain of losing their temporal power. They rejected infant baptism, and taught that those who joined them must be baptized anew with the baptism of the Spirit; they also proclaimed the community of goods, and the equality of all Christians. These doctrines naturally fell in with and supported the "Peasant War" (q.v.) that had about that time (1525) broken out from real causes of oppression. The sect spread rapidly through Westphalia, Holstein, and the Netherlands, in spite of the severest persecutions. The battle of Frankenhausen (see MÜNZER) crushed their progress in Saxony and Franconia. Still, scattered adherents of the doctrines continued, and were again brought together in various places by travelling preachers. In this capacity, one Melchior Hoffman, a furrier of Swabia, distinguished himself, who appeared as a visionary preacher in Kiel in 1527, and in Emden in 1528. In the last town he installed a baker, John Matthiesen, of Haarlem, as bishop, and then went to Strasburg, where he died in prison. Matthiesen began to send out apostles of the new doctrine. Two of these went to Münster, where they found fanatical coadjutors in the Protestant minister Rothmann, and the burghers Knipperdolling and Krechting, and were shortly joined by the tailor Bockhold of Leyden, and Gerrit Kippenbrock of Amsterdam, a book-binder, and at last by Matthiesen himself. With their adherents, they soon made themselves masters of the city; Matthiesen set up as a prophet, and when he lost his life in a sally against the Bishop of Münster, who was besieging the town, Bockhold and Knipperdolling took his place. The churches were now destroyed, and twelve judges were appointed over the tribes, as among the Israelites; and Bockhold (1534) had himself crowned king of the 'New



## ANABAPTISTS.

Sion,' under the name of John of Leyden (q.v.). The anabaptist madness in Münster now went beyond all bounds. The city became the scene of the wildest licentiousness; until several Protestant princes, uniting with the bishop, took the city, and by putting to death the leaders, put an end to the new kingdom (1535).

But the principles disseminated by the A. were not so easily crushed. As early as 1533 the adherents of the sect had been driven from Emden and taken refuge in the Netherlands; and in Amsterdam the doctrine took root and spread. Bockhold also had sent out apostles, some of whom had given up the wild fanaticism of their master; they let alone the community of goods and women, and taught the other doctrines of the A., and the establishment of a new kingdom of pure Christians. They grounded their doctrines chiefly on the Apocalypse. One of the most distinguished of this class was David Joris, a glass-painter of Delft (1501-56). Joris united liberalism with anabaptism, devoted himself to mystic theology, and sought to effect a union of parties. He gained many adherents, who studied his book of Miracles (*Wunderbuch*), which appeared at Deventer, 1542, and looked upon him as a sort of new Messiah. Being persecuted, he withdrew from his party, lived inoffensively at Basle, under the name of John of Bruges, and died there in the communion of the reformed church. It was only in 1559 that his heretical doctrines came to light, when the council of Basle had the bones of Joris dug up, and burned under the gallows.

The rude and fanatical period of the history of anabaptism closes with the scandal of Münster. A new era begins with Menno Simons. See MENNO. Surrounded by dangers, Menno succeeded, by prudent zeal, in collecting the scattered adherents of the sect, and in founding congregations in the Netherlands, and in various parts of Germany. He called the members of the community 'God's Congregation, poor, unarmed Christians, brothers'; later, they took the name of Mennonites, and at present they call themselves, in Germany, Taufgesinnte; in Holland, Doopsgezinden—corresponding very nearly to the English designation Baptists. This, besides being a more appropriate designation, avoids offensive association with the early Anabaptists. Menno expounded his principles in his *Fundament buche von dem rechten Christlichen Glauben*, 1556 (Elements of the True Christian Faith). This book is still an authority among the body, who lay particular stress on receiving the doctrines of the Scripture with simple faith, and acting strictly up to them, and set no value on learning and the scientific elaboration of doctrines. They reject the taking of oaths, war, every kind of revenge, divorce (except for adultery), infant baptism, and the undertaking of the office of magistrate; magistracy, they hold to be an institution necessary for the present, but foreign to the kingdom of Christ; the church is the community of the saints, which must be kept pure by strict discipline. With regard to grace, they believe it to be universal in its provision, and offered to all; and their views of the Lord's Supper accord

## ANABAPTISTS.

with those of Zwingli; in its celebration, the rite of feet washing is retained. In Germany, Switzerland, and Alsace, their form of worship differs little from the Lutheran. Their bishops, elders, and teachers serve gratis. Children receive their name at birth, baptism is performed in the place of worship, and adults that join the sect are rebaptized.

But with these general principles, there have been endless diversities and splits in the sect, occasioned by differences as to the strictness of discipline. This cause divided the body, as early as 1554, into the Mild and the Strict Mennonites. The first are known by the title of Waterländers, from a place in Holland; the second split again into a multitude of subdivisions, according to minute shades of strictness, and their several designations, derived from the names of leaders, places, and even peculiarities of dress (John-Jacob Christians, Buttoners, Hook-and-eye-ers, etc.), bewilder the student of ecclesiastical history. The purity of their lives, however, everywhere commanded respect, and their industry made them prosperous; so that they gradually secured formal toleration in many places.

Almost the only split among the early continental Baptists on doctrinal grounds was that which took place in Amsterdam in 1664. Arminianism had not been without its influence, especially among the Waterländers, originally more liberal in their views. A leading congregation accordingly divided into two parties, one (Galenists, from Galenus, their leader) advocating freer views in doctrine and discipline; the other (Apostoolists, from Samuel Apostool) adhering to absolute predestination and the discipline of Menno. The liberal party rejected creeds as of human invention, adopted much of the philosophy and theology of England, and exercised no little influence on the intellectual progress of Holland. These two parties gradually absorbed the other sections of the Baptists in the Netherlands; and about the beginning of the 19th c., a union took place by which all the congregations now belong to one body.

In Germany, the Baptists have made some successful attempts in recent times to extend their church. Under the Baptist Union of Germany (which, although including churches in Holland, Poland, and other countries, derives its strength largely from Prussia), there are upwards of 100 churches, with about 20,000 members. In Prussia, various concessions had been made to the Baptists early in this century, such as exemption from military service. They were tolerated in Bavaria, Baden, Würtemberg, Mecklenburg, Russia, France, and Denmark; but were expelled from Sweden. Wherever they are settled, they are respected as quiet, industrious subjects; but several German governments have imposed restrictions on their exercise of public worship; the reason assigned being the tendency to visionary enthusiasm, which had again shown itself in some congregations.

The representatives of the sect in the United States and Great Britain have little or no historical connection with the earlier A. of the continent. See **BAPTISTS**.



## ANABASIDÆ—ANACARDIACEÆ.

**ANABASIDÆ**, *ăn'ă-bās'î-dē*, or **LABYRINTHBRANCHIDÆ**, *lăb'î-rînth-î-brangk'î-dē*: family of Acanthopterygious Fishes, characterized by a remarkable structure of the upper membranes of the pharynx, which are divided into small irregular leaves, containing between them cellular reservoirs. These retain water sufficient to keep the gills moist for a considerable time, and so enable the fish to subsist out of water, and to travel some distance on dry ground; some of the species, as the Climbing Perch (q.v.) of India (*Anabas scandens*), climbing steep banks, or even trees, by means of the spines of the fins, tail, and gill-covers. *Ophicephalus marginatus* is often seen travelling among the grass in the beginning of the rainy season. The fishes of this family appear to leave the water for various reasons; but usually, it appears, upon account of the drying up of pools in periodical droughts, their peculiar organization enabling them to go in search of others. They are all freshwater fishes, natives of the s.e. of Asia, continent and islands, and of s. Africa. The species are numerous, and are arranged under eleven genera. Some of them are much esteemed for their delicacy as food.

**ANABASIS**, *ăn-ăb'-ă-sîs* [Greek]: literally, an ascent or a march out of a lower into a higher country—the name of two historical works: 1. The *A. of Cyrus*, written by Xenophon, which gives a narrative of the unfortunate expedition of the younger Cyrus against his brother, the Persian king Artaxerxes, and of the retreat of his 10,000 Greek allies under the command of Xenophon; 2. The *A. of Alexander*, written by Arrian, and giving an account of the campaigns of Alexander the Great.

**ANABLEPS**, *ăn'ă-blěps* [from the Gr. *anableps*, to look up]: genus of Fishes of the order *Malacopterygii Abdominales*, family *Cyprinidæ* of Cuvier—of the family *Cyprinodontidæ* (q.v.) of Agassiz—characterized by a structure of the eyes to which there is nothing similar in any other vertebrated animals. This consists in a division of the *cornea* and *iris* into two somewhat unequal elliptical parts, by transverse bands formed of the *conjunctiva* (see EYE), so that the animal appears to have four eyes, and there are really two pupils on each side, the other parts single.

**ANABOLISM**, n. *a-năb'ô-lîzm* [Gr. *anabolē*, throwing up, or rising up]: process by which one simple substance is transformed into another more complex, and which involves the storing up of energy; assimilation, as in the conversion of the nutritive elements of food into living tissue: the converse of catabolism, which is the setting free of energy previously stored up. The term is used in defining the formation of protoplasm.

**ANACAMPTICS**, n. plu. *ăn'ă-kăm'tîks* [Gr. *ana*, back; *kampto*, I bend]: the doctrine of reflected light or sound. **AN'ACAMP'TIC**, a. pertaining to.

**ANACARDIACEÆ**, *ăn-ă-kâr'dî-ă'sē-ē* (**TEREBINTACEÆ** of some botanists, and part of **TEREBINTACEÆ** of others): natural order of dicotyledonous or exogenous plants, consisting of trees and shrubs, which abound in a resinous,



## ANACARDIUM—ANACHARIS.

sometimes acrid and poisonous juice. The leaves are alternate and without dots; the flowers inconspicuous, usually unisexual. The calyx is generally small and persistent, and has generally five divisions; the petals are perigynous, equal in number to the segments of the calyx, imbricated in æstivation, occasionally wanting. The stamens are equal in number to the petals, and alternate with them, or twice as many, or more; distinct when there is a fleshy disk, cohering at the base when the disk is wanting. The ovary is usually single, free or adhering to the calyx, 1-celled; the styles 1, 3, or 4, occasionally wanting; the ovule solitary, attached to the bottom of the cell by a cord. The fruit is usually a drupe, the seed exalbuminous. The order contains about 95 known species, chiefly but not exclusively tropical, among which are a considerable number valuable for the resinous juices and varnishes which they yield, as the varnish of Sylhet, varnish of Martaban, Japan lacquer, etc., and others, which produce wholesome and pleasant fruits. See CASHEW NUT: PISTACIA: MASTIC: TURPENTINE TREE: MANGO: HOG PLUM: SUMACH: POISON IVY.

ANACARDIUM, n. *ăn'ă-kâr'dĩ-ũm* [Gr. *ana*, similar to; *kar'dia*, the heart]: the name of a genus of ornamental trees, one of which yields the cashew or marking nut, Ord. *An'-ũcardiũ'cẽæ*. See CASHEW NUT.

ANACATHARTIC, a. *ăn'ă-kă-thâr'tik* [Gr. *ana*, upwards; *kathar'sis*, purging]: exciting discharges from the mouth and nose: N. a medicine which does so; opposite of CATHARTIC.

ANACHARIS n. *ăn-ăk'ă-rĩs* [Gr. *ana*, without; *charis*, grace, beauty]: genus of plants of the natural order *Hydrocharideæ* (q.v.), of which a species, *A. alsinastrum* (*Elodea*

*Canadensis* of some botanists), has recently become naturalized in Britain, suddenly appearing in so great abundance as to impede the navigation of some rivers and canals. It is a native of N. Amer. growing in ponds and slow streams; and is a dark-green, much-branched perennial, entirely floating under water. its flowers only appearing above water for a very short time at the period of fertilization, as in others of the order to which it belongs. It has numerous leaves, which are either opposite, or in whorls of three or four, without foot-stalks, linear-oblong, transparent, 3-4 lines long. The female flowers are sessile in the upper axils, and are enclosed in a small 2-lobed spathe; the slender tube of the



Anacharis Alsinastrum.

perianth is often two or three inches long, so as to at

## ANACHARSIS—ANACHRONISM.

tain the surface of the water, where it terminates in three or six small spreading segments. The male flowers are seldom observed. The plant, first found in Britain in 1842 in the lake of Dunse Castle, and again in 1847 in the reservoirs of a canal in Leicestershire, is now very abundant and troublesome in the Trent, Derwent, and other rivers. Its rapidity of growth is extraordinary. Immense masses disfigure the shallows of the Trent, and cover the beds of the deeps. It strikes its shoots under the mud in a lateral direction for six inches or a foot, and then rises and spreads. The stems are very brittle, and every fragment is capable of growing, so that the means usually adopted for riddance of it serve rather for its propagation. It appears that water fowl are very fond of it, and by them, probably, its seeds may be conveyed from one river to another. It has been found that swans may be fed upon it with advantage, and its excessive growth kept down more effectually in this way than in any other. It is supposed to be a great impediment to the progress of salmon ascending the rivers in which it occurs, but for some kinds of fish, it probably affords both food and shelter. Our common Tape grass (q.v.) or Eel-grass (*Vallisneria*), native also in Europe, is of this family.

ANACHARSIS, *àn-ă-kărs sîs*: lived B.C. 7th c.. a Scythian, brother of King Saulios, visited Athens in the time of Solon, with whom he lived on terms of intimacy, but whose abilities for framing a constitution he does not seem to have estimated highly. Incited by a love of learning, he subsequently travelled through several countries. On account of his clearness of understanding, he was numbered among the seven wise men; and many sagacious proverbs and sayings were ascribed to him. No other 'barbarian' ever received the Athenian franchise. The letters which bear his name were written long after his time. It is said that, after his return to his native land, he was put to death by order of the king, who feared the introduction of the mysteries belonging to the Greek religion, in which it was supposed that A. had been initiated.

Under the title, *Voyage du Jeune Anacharsis en Grèce* (Travels of the Young Anacharsis in Greece), Jean Jacques Barthélemy, a well-known French author (q.v.), wrote a description of Greek life and manners, displaying learning and good taste, but disfigured by many anachronisms. A. is made to visit Athens only a few years before the birth of Alexander the Great, and the features of several distinct periods in Grecian history are confusedly regarded as having been contemporaneous. The book, therefore, will not bear a critical examination; but it has contributed its share to an improved knowledge of ancient life, and has given rise to several similar works, such as the *Gallus* and *Charicles* of Becker. The A. of Barthélemy has been translated into English.

ANACHORET: see ANCHORET.

ANACHRONISM, n. *ăn-ăk'ô-nîzm* [Gr. *ana*, back; *chronos*, time]: an error in point of time; a mistake in telling



## ANACLASTICS—ANACREON.

when an event happened. ANACH'RONIS'TIC, a. -tĭk, erroneous in date. Sometimes an anachronism is purposely made for the sake of effect, or to bring certain events within convenient compass for dramatic purposes. Shakespeare, in his *Julius Cæsar*, makes the 'clock' strike three; and Schiller, in his *Piccolomini*, speaks of a 'lightning-conductor' as existing about 150 years before the date of its invention. These discrepancies, however, do not seriously injure the general truth of a poetical work. The A. is more offensive when, in a work which pedantically adheres to the costumes and other external features of old times, we find a modern style of thought and language, as in the old French dramas of Corneille and Racine. In popular epic poetry, A. is a common feature: Achilles is always young; Helena, always beautiful. In their versions of old classic traditions, the writers in the middle ages converted Alexander, Æneas, and other ancient heroes, into good Christian knights of the 12th c. In the *Nibelungen-lied*, Attila and Theodoric are good friends and allies, though the latter began to reign some 40 years after the former. At the end of the poem, the heroine, who must have been nearly 60 years old, is still 'the beautiful Queen Kriemhild.'—Many ludicrous examples of A. may be found in old paintings—e.g., Abraham, Isaac, and Jacob in modern costumes.

ANACLASTICS, n. plu. ān'ă-klās'tĭks [Gr. *ana*, back; *klasis*, a breaking]: that part of optics which treats of the refraction of light—now called *dioptrics*. AN'ACLAS'TIC, a. -tĭk, pertaining to.

ANACOLUTHON, n. ān'ă-kō-lō'thōn, or ANACOLUTH, n. ān'ă kō-lōth [Gr. *anakolouthos*, not in consecutive order—from *an*, not; *akol' outhos*, following]: in *gram.* or *rhet.*, lack of strict logical sequence in the construction of a sentence, when one of the parts has a different grammatical structure from the remainder. Good writers sometimes sacrifice this logical sequence to emphasis or to vividness. In colloquial speech, A. is common. AN'ACOLU'THIC, a. -thĭk, or AN'-ACOLU'THICAL, a. -thĭ-kāl, wanting sequence or connection in its parts. AN'ACOLU'THICALLY, ad. -lĭ.

ANACONDA, n. ān'ă-kōn'dă: any enormous serpent; specifically, a great S. Amer. serpent. See BOA: PYTHON.

ANACON'DA: city in Deer Lodge co., Mont.; on the Union Pacific railroad, 42 m. s. of Garrison. A. is a noted mining and smelting town, employing nearly 2,000 men in smelting and copper refining. It has 1 national bank (cap. \$100,000), 1 hotel (cost \$250,000), a number of churches and public schools, and is lighted by gas and electricity. Its commercial business with mining camps is large. Pop. (1900) 9,453.

ANACREON, ā-năk're-ōn: about B.C. 562–477; b. Teos, in Ionia: one of the most esteemed lyric poets of Greece. He spent part of his youth in Abdera, and rose to fame about B.C. 530. He was patronized by Polycrates, ruler of Samos, at whose court he sang the praise of wine and beauty. After the death of Polycrates, he was invited to Athens, B.C. 521, and was received with great honor by Hipparchus. On the fall of Hipparchus, he left Athens, and probably returned

## ANACREONTIC—ANÆMIA.

to Teos, from which, during the insurrection of Ionia against Darius, he fled to Abdera, where he died, at the age of 85. According to tradition, he was choked by a dried grape. Great honors were paid to him after his death; Teos put his likeness upon its coins, and a statue was raised to him on the Acropolis of Athens, which represented him in a state of vinous hilarity.

Only a few of his poems have been preserved. Of five Books which once existed, only 68 lyrics now exist which bear his name; but of these, comparatively few are to be confidently regarded as genuine. They exhibit great simplicity and delicacy of expression, fertility of invention, and variety of illustration. Moore, a poet of congenial spirit, translated the *Odes* of A. into English verse.

**ANACREONTIC**, a. *ăn-ăk'rě-ôn'tîk*, after the manner of the Greek poet Anacreon; joyous. **ANAC'REON'TICS**, n. plu. *-tîks*, verses like Anacreon's love and drinking songs.

**ANACY'CLUS**: see **PELLITORY OF SPAIN**.

**ANADEM**, a. *ăn'ă-dēm* [L. and Gr. *anadēma*—from Gr. *ana*, up; *dein*, to bind]: a garland or fillet; a crown of flowers.

**ANADIPLOSIS**, n. *ăn'ă-dī-plō'sîs* [Gr. *ana*, again *diplos*, double]: in *poet.* and *rhet.*, a repetition of the last word or words in a line or clause in the beginning of the next.

**ANADROMOUS**, a. *ăn-ăd'rō-mūs* [Gr. *ana*, up; *dromos*, a running, a race]: in *zool.*, applied to those fish, as the salmon and sturgeon, which periodically visit fresh-water lakes and rivers.

**ANADYOMENE**, *ăn'ă-dī-ôm'ē-nē* ['emerging']: one of the names of Venus, as in a painting by Apelles, the goddess is represented rising from the sea, and wringing her flowing wet hair. Phryne or Pancaste was supposed to have supplied the model for this master-piece of Apelles. The inhabitants of the island of Cos bought the picture, and placed it in the temple of Æsculapius. Augustus afterwards bought it for 100 talents of remitted taxes, and placed it in the temple of Venus Genetrix. It is frequently described in the Greek anthology.

**ANÆMIA**, or **ANEMIA**, n. *ăn-ě'mî-ă* [Gr. *a*, without; *haima*, blood]: condition of the system in which the blood, by reason of its poverty through either lack or loss, is incompetent to supply adequate nourishment to the various organs. **ANÆMOUS**, a. *ăn-ě'mūs*, or **ANÆMIC**, a. *ăn-ě'mîk*, without organs of circulation, and without blood.—*Anæmia* is essentially a diminution in the quantity, or a deficiency in the proportion of some constituent element, e.g., in the red corpuscles (see **BLOOD**). Persons in an anæmic condition have pale, waxy complexions, pallid lips and tongues, and if blood be drawn from them, it forms a clot which is less red, and also smaller in proportion to the serum, than blood from a healthy person. They suffer from palpitations, fainting, and headaches, ringing in the ears, and disturbed



## ANÆSTHESIA.

vision, and the symptoms may simulate organic disease within the head or of the heart. This A. condition may be induced by repeated losses of blood, or by defective nutrition, or by some cause, as in chlorosis, when the balance is disturbed between the loss and the reproduction of the red corpuscles.

The curative treatment of A. consists in allowing the patient fresh air, good nourishment, and those materials which promote the formation of the deficient elements of the vital fluid. Of these, the principal is iron, of which there are several preparations. This remedy has, in some instances of chlorosis, doubled the proportion of red blood corpuscles in a very short time.

ANÆSTHESIA, n. *ăn'ēs-thēzh'ī-ă* [Gr. *anaisthēsia*, the want or loss of feeling—from *an*, without; *aisthēsis*, sensation]: the loss of feeling or sensation by the inhalation of an ethereal vapor, or by organic or functional disease of the nervous system; also, in same sense, ANÆSTHETICS, n. pl. *ăn'ēs-thēt'iks*. ANÆSTHET'IC, n. an ethereal vapor inhaled to induce loss of feeling and sensation; any substance capable of producing anæsthesia.

ANÆSTHESIA: a loss of sensibility to external impressions, which may involve a part or the whole surface of the body. In some diseased conditions of the nervous centres, a part of the body may become totally insensible to pain, while in another part, sensation may be unnaturally acute, or be in a state of hyperæsthesia. When a nerve is divided, there is no feeling of touch or pain referred to the parts which it supplies, because these are cut off from communication with the brain; and in some diseases, as the *elephantiasis græcorum*, a loss of sensation in patches of the skin is an early and characteristic symptom. This insensibility to external impressions may be either *peripheral*—that is on the surface of the body—or *central*, that is, from a cause acting primarily upon the brain or spinal cord.

In ancient writers there are notices of insensibility or indifference to pain as obtained by means of Indian hemp (*Cannabis Indica*), either inhaled or taken into the stomach. The Chinese, more than 1,500 years ago, used a preparation of hemp, or *ma-yo*, to annul pain. The Greeks and Romans used mandragora for a similar purpose (*poiein anaisthesian*); and as late as the 13th c., the vapor from a sponge filled with mandragora, opium, and other sedatives was used. The mandragora, however, occasionally induced convulsions, with other alarming symptoms; and though Bulleyn, an English author (1579), mentions the possibility of putting patients who were to be cut for the stone into 'a trance or a deepe terrible dreame' by its use, it gradually became obsolete and was banished from the pharmacopœia. John Baptista Porta, of Naples, in his work on Natural Magic (1597), speaks of a quintessence extracted from medicines by somniferous *menstrua*. This was kept in leaden vessels, perfectly closed, lest the *aura* should escape, for the medicine would vanish away. 'When it is used, the cover being removed, it is applied to the

## ANÆSTHESIA.

nostrils of the sleeper, who draws in the most subtle power of the vapor by smelling, and so blocks up the fortress of the senses, that he is plunged into the most profound sleep, and cannot be roused without the greatest effort. . . . These things are plain to the skilful physician, but unintelligible to the wicked.' In 1784, Dr. Moore, of London, used compression on the nerves of a limb requiring amputation, but this method was in itself productive of much pain. In 1800, Sir Humphry Davy, experimenting with the nitrous oxide or laughing gas, suggested its usefulness as an anæsthetic; and in 1828, Dr. Hickman suggested carbonic acid gas. As early as 1795, Dr. Pearson had used the vapor of sulphuric ether for the relief of spasmodic affections of the respiration. The fact that sulphuric ether could produce insensibility was shown by the American physicians, Godwin (1822), Mitchell (1832), Jackson (1833), Wood and Bache (1834); but it was first used to prevent the pain of an operation in 1846, by Dr. Morton, a dentist of Boston. The news of his success reached England, 1846, Dec. 17; on the 19th, Mr. Robinson, a dentist, and Mr. Liston, the eminent surgeon, operated on patients rendered insensible by the inhalation of sulphuric ether. This material was extensively used for a year, when Sir J. Y. Simpson, of Edinburgh, discovered the anæsthetic powers of *Chloroform* (see CHLOROFORM), and introduced the use of it into his own department, midwifery. Since that time, chloroform has been the anæsthetic in general use in Europe, but ether is preferred in America. It is now the opinion of most medical men that chloroform should not be given where there is weak action of the heart from disease. Other substances have been used by inhalation, such as nitric ether, and bichloride of methylene. The latter substance has not been generally accepted, as it depresses to a dangerous extent after it has been administered for some time. See METHYLENE.

Nothing could be more desirable in medical practice than the power of producing *local A.* Freezing mixtures have been employed; a stream of carbonic acid or cooled air, or a finely divided spray of ether, have been thrown on the part. All of these methods have the disadvantage that they injure the tissues, and may be followed by much pain. Recently, in dentistry, the inhalation of nitrous oxide has been much employed. It is rapid in action, and is not usually followed by unpleasant effects; but as it induces a condition in the blood similar to that in asphyxia, its use is not without danger. Since 1884, COCAINE (q.v.), an alkaloid of COCA (q.v.), has been found surprisingly efficient as a *local* anæsthetic, without harmful results. As a general anæsthetic also, it has enthusiastic advocates, though some high authorities question its safety. Though anæsthetics are a great blessing, none of them now known is safe in unskilful hands.



## ANAGALLIS—ANAGRAM.

**ANAGALLIS:** see **FIMPERNEL**.

**ANAGLYPH**, n. *ăn'ă-glĭf* [Gr. *ana*, up; *glupho*, I engrave]: an engraved or sculptured ornament in relief. **AN'AGLYPH'IC**, a. *-ĭk*, pertaining to. **AN'AGLYP'TIC**, a. *-tĭk*, pertaining to the arts of chasing, engraving, sculpture, etc.

**ANAGNI**, *ă-năn'yē* (anc. *Anagnia*); town of Central Italy, 37 m. e.s.e. from Rome. It stands on a hill in a fertile district, and, although ill-built, is the residence of many noble families. It is the seat of a bishop. There are some remains of ancient buildings. The ancient *Anagnia* was the chief city of the Hernici. It was a place of importance during the whole period of Roman history, and Virgil mentions it as the 'wealthy Anagnia.' Pop. 6,500.

**ANAGOGICAL**, a. *ăn'ă-gŏj'ĭ-kăl* [Gr. *ana*, up; *agōgē*, a leading]: religiously exalting; spiritual. **AN'AGOG'ICALLY**, ad. *-lĭ*.

**ANAGRAM**, n. *ăn'ă-grăġm* [Gr. *ana*, back; *gramma*, a letter]: a new word formed from the letters of another word; a reversal or other transposition of letters. **AN'-AGRAMMAT'IC**, a. *-ĭk*, or **-ICAL**, a. *-ĭ-kăl*, pertaining to: **-ICALLY**, ad. *-lĭ*. **AN'AGRAM'MATIZE**, v. *-tĭz*, to make anagrams: **-TIZING**, imp.: **-TIZED'**, pp. *-tĭzd*: **-TIST**, n. one who. —An *Anagram* is the transposition of the letters of a word, phrase, or short sentence, so as to form a new word or sentence. An instance of a simple reversal of the order of letters is in *evil*, as the A. of 'live.' The Cabalists attached great importance to anagrams, believing in a mystic relation of them to the character or destiny of the persons from whose names they were formed. Plato and the later Platonists had a similar notion. Although now classed among follies, or at best among ingenious trifles, anagrams formerly employed the most serious minds. Cotton Mather, in his elegy on the death of John Wilson, first pastor of Boston, mentions

His care to guide his flock and feed his lambs,  
By words, works, prayers, psalms, alms, and *anagrams*.

The best anagrams are such as have in the new order of letters, some signification appropriate to that from which they are formed. It was a great triumph of the mediæval anagrammatist to find in Pilate's question to Christ, *Quid est veritas?* (What is truth?) its own answer, *Est vir qui adest* (It is the Man who is here). Later instances are the A. of 'Horatio Nelson,' *Honor est a Nilo* (Honor is from the Nile); the A. of 'Florence Nightingale,' *Flit on, cheering angel*. Anagrams were much employed both in compliment and in satire, and often with much straining in omission, addition, or alteration of letters. The flatterers of James I. of England proved his right to the British monarchy, as the descendant of the mythical King Arthur, from his name, *Charles James Stuart*, which becomes *Claims Arthur's Seat*. An author, in dedicating a book to the same monarch, finds that in *James Stuart* he has a *just master*.



## ANAGRAPH—ANAL GLANDS.

**ANAGRAPH**, n. *ăn'ă-grăf* [Gr. *ana*, up; *grapho*, I write]: a commentary.

**ANAHUAC**, *ă-nă-wăk'* [Old Mex., near the water]: original name of the ancient Mexican kingdom; now designating vaguely the table land of Mexico, or portions of it, with the city of Mexico as the centre. This great plateau between the two great chains of the Cordilleras (q.v.) comprises three-fifths of Mexico, and is 5,000—9,000 ft. above sea level.—The people termed *Anahualtecas* (perhaps as living near the numerous lakes of this plateau) are the Aztecs: see MEXICO.

**ANAKIM**, *ăn'a-kīm*: gigantic race whose stronghold was Kirjath-arba, in s. Palestine. Some biblical critics deem them not Canaanites, as they are not in the list of doomed nations; others conclude from the fact that mention is made only of three individuals or families, that the A. were merely particular tribes of the widespread Amorites, distinguished for their unusual stature. Be that as it may, the Israelites, whose spies in advance were terrified by the A., considered them too dangerous for neighbors, and subjected them to the same stern treatment as the rest. Those who escaped the sword of Joshua fled to the country of the Philistines; and it has been conjectured that Goliath and the other Philistine giants were their descendants; a supposition probable from the fact that the particular places in which the fugitive A. took refuge were Gaza, Gath, and Ashdod. The word Anak means a necklace or neck chain. The A., however, probably derived their name from Anak, the son of Arba.

**ANAL**, a. *ă'năl* [L. *anus*, the excretory orifice]: pertaining to, or situated near, the anus.

**ANALCIME**, n. *ăn'ăl-sīm* [Gr. *a*, without; *alkīmos*, strong]: a zeolitic mineral found abundantly in trappean rocks, so called from its feebly electric properties.

**ANALECTS**, n. plu. *ăn'ă-lēkts* [Gr. *analek'tos*, gathered together—from *ana*, up; *legein*, to gather]: selected fragments of authors. **ANALECTIC**, a. *ăn'ă-lēk'tīk*, selecting; collected; choice.

**ANALEMMA**, n. *ăn'ă-lēm'ma* [L.—from Gr. *ana*, up; *lam'bano*, I take]: in *geom.*, a projection of a sphere on the plane of the meridian.

**ANALEPSIS**, n. *ăn'ă-lēp'sīs* [Gr. a recovery]: in *med.*, recovery; convalescence. **AN'ALEP'TIC**, a. *-tīk*, restorative: N. a medicine which gives strength.

**ANALGESIA**, n. *ăn-ăl-jē'sī-a*, or **ANALGIA**, *ăn-ăl'jī-a* [Gr. *a*, without; *algos*, pain]: insensibility to pain, with or without insensibility to touch. **ANALGESIC**, *-jēs'ic*, or **ANALGETIC**, pertaining to analgesia; insensible to pain.

**ANAL GLANDS**: a large and diversified group of glands, found in many animals, and generally characterized by the disagreeable odor of their secretion. Those to which the name most strictly belongs are of frequent occurrence

## ANALLANTOIDEA—ANALOGUE.

among carnivora and rodents; they consist of follicles which pour their secretion into sacs with muscular walls and narrow orifices, placed one on each side of the anus. According to the most recent investigations, it appears that these sacs are prolongations inwards of the common integument, and that two sorts of glands open into them; one of a lobulated structure, having a fatty secretion, and representing the sebaceous glands of the skin greatly hypertrophied, the other crowded more at the bottom of the sac, tubular, and elaborating the specific secretion. In the hyena, there is a single sac, which opens by a transverse fissure above the vent. There is a gradual passage from true A. G. to others of a somewhat different character. Thus, there are glands called inguinal in the hare and rabbit—little bare places pouring out an unctuous secretion, which are held to be equivalent to A. G., only not inclosed in sacs. The civet cat has an anal sac on each side of the vent; and also two other sacs opening by a common outlet in front of the vent; and from the latter is derived the substance known as civet, which the negroes seek for on the trees where it has been left by the civet cats. The civet gland furnishes a natural link between the A. G. and those more closely connected with the genital apertures, called preputial. The most remarkable are those of the beaver, large sacs found both in the male and female, and which furnish the castoreum of commerce. The beaver has true A. G. besides. The sac which contains the musk of the muskdeer lies in the middle line beneath the skin of the abdomen, and opens at the prepuce. The secretion peculiar to badgers, polecats, and skunks, and which they use as an instrument of defense, shielding themselves from their adversaries by an overpowering and intolerable odor, comes from a pouch situated beneath the tail. In some animals, we meet with secretions similar to some of the above, poured out on other parts of the body. Thus, in the bat, there are glands on the face opening above the mouth, which prepare a fetid oily secretion; the so-called lachrymal follicles of ruminants, and the cutaneous glands of the tail of the deer, secrete a dark unctuous humor; and the temporal gland between the eye and the ear of the elephant pours out an oily substance at rutting-time. The peccary has an odoriferous gland on its back; and the crocodile has a musk-sac under the lower jaw. Anal sacs opening immediately behind the vent are also found in the crocodile and in many serpents.

ANALLANTOIDEA, n. plu. *ăn'ăl-ăn-toy'dē-ă* [Gr. *an*, without, and *allantoidea*, which see]: the group of Vertebrata in which the embryo is not furnished with an allantois.

ANALOGUE, *ăn'ă-lōg* (see ANALOGY): term in Comparative Anatomy. Organs are *analogous* to one another, or are *analogues*, when they perform the same function, though they may be altogether different in structure; as the wings of a bird, and the wings of an insect. Organs, again, are *homologous*, or *homologues*, when they are constructed on the same plan, undergo a similar development, and bear the same relative position, and this independent of either



## ANALOGY.

form or function. Thus, the arms of a man and the wings of a bird are homologues of one another. See **HOMOLOGY**.

**ANALOGY**, n. *ă-năl'ô-jî* [Gr. *anal'ogos*, agreeing with, conformable to—from *ana*, up to, similar to; *logos*, word, ratio, proportion]: resemblance between one thing and another; similarity or likeness between things in their properties or qualities. **ANALOGOUS**, a. *ă-năl'ô-gûs*, bearing some resemblance or proportion to; applied to parts which perform the same function. **ANALOGICAL**, a. *ăn'ă-lôj'ă-kûl*, used by way of analogy. **AN'ALOG'ICALLY**, ad. *-lî*. **AN'ALOG'ICALNESS**, n. **ANALOGIZE**, v. *ă-năl'ô-jîz*, to explain by analogy. **ANAL'OGI'ZING**, imp. **ANAL'OGIZED**, pp. *-jîzd*. **ANAL'OGIST**, n. *-jîst*, one who. **ANAL'OGISM**, n. *-jîzm*, investigation by analogy. **ANALOGUE**, n. *ăn'ă-lôg*, an object that has a resemblance to, or correspondence with, another object. *analogue* regards similarity of function—*homologue*, identity of parts. **ANAL'OGOUSLY**, ad. *-lî*. **ANALOGON**, n. *ăn-ăl'ô-gôn*, same sense as *analogue*. **SYN.** of 'analogous': correspondent; resembling; similar; like.

**ANAL'OGY**: an agreement or correspondence in certain respects between things in other respects different. Euclid employed it to signify proportion, or the equality of ratios, and it has retained this sense in mathematics; but it is a term little used in the exact sciences, and of very frequent use in every other department of knowledge and of human affairs. In Grammar, the A. of language is the correspondence of a word or phrase with the genius of the language, as learned from the manner in which its words and phrases are ordinarily formed. A. supposes a rule inferred from observation of instances, and upon the application of which we venture in other instances, not precisely, but in some respects, similar, with more or less confidence, according to the degree of ascertained similarity, and according to the extent of observation from which our knowledge of the rule has been derived. The opposite to A. is *Anomaly* [Gr. irregularity]; and this term is used not only in Grammar, but with reference to objects of Natural History which in any respect are exceptions to the ordinary rule of their class or kind. In the progress of science, analogies have been discovered pervading all nature, and upon which conclusions are often based with great confidence and safety. Reasoning from A. indeed warrants only probable conclusions; but the probability may become of a very high degree, and in the affairs of life we must often act upon conclusions thus attained. Reasoning from A., however, requires much caution in the reasoner. Yet even when its conclusions are very uncertain, they often serve to guide inquiry and lead to discovery. Some of the most brilliant discoveries recently made in Natural Science were the result of investigations thus directed. Where the proper evidence of truth is of another kind, arguments from A. are often of great use for the removal of objections. It is thus that they are employed by Bishop Butler in his *A. of Religion, Natural and Revealed, to the Constitution and Course of Nature*. In Law, reasoning from A. must often,



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to a certain extent, be admitted in the application of statutes to particular cases. Upon similar reasoning, the practice of medicine very much depends. To discover the meaning of any composition, it is also often necessary; the sense of the author in a passage somewhat obscure being in some measure determined according to passages in which he has expressed himself more clearly. The application of this rule to the interpretation of Scripture is a point of difference between Protestants and Roman Catholics, the latter insisting upon the interpretation of difficult passages by ecclesiastical tradition and authority. The extension of it to the whole Scriptures, however, depends upon the admission of their inspiration: but this, when fully admitted, warrants a more confident use of analogical reasoning than in the case of the works, or even of a single work, of an uninspired author. Protestant theologians have very generally employed, with reference to this rule of interpretation, the phrase 'A. of Faith,' deriving it from Rom. xii. 6; but the meaning of the expression in that verse is disputed. However, the reality of an A. of faith, and the right of reasoning from it, are not affected by any criticism on that verse.

**ANALYSIS**, n. *ă-năl'î-sîs* [Gr. *anal'ûsis*, an untying or loosening, resolution—from *ana*, again; *lusis*, a loosening]: the separation of a compound into its elements; the tracing of things to their source; the opposite of *synthesis*. **ANAL'YSES**, plu. *-î-sēz*. **ANALYZE**, v. *ăn'ă-lîz*, to separate a compound into its elements; to trace a thing to its first principles or motives. **AN'ALYZ'ING**, imp. **AN'ALYZED**, pp. *-lîzd*. **ANALYST**, n. *ăn'ă-lîst*, one who analyzes. **AN'ALYZ'ER**, n. one who. **AN'ALYZ'ABLE**, a. *-bl*, that may be analyzed. **ANALYTIC**, a. *ăn'ă-lît'îk*, or **ANALYT'ICAL**, a. *-î-kăl*, pertaining to analysis; that separates a compound into its elements. **AN'ALYT'ICALLY**, ad. *-î-kăl-î*, after the manner of analysis. **ANALYTICS**, n. plu. *ăn'ă-lît'îks*, the science of analysis.

**ANAL'YSIS**: the resolution of a whole into its component parts. In Mental Philosophy, this term is applied to the logical treatment of an idea so as to resolve it into other ideas which combine to form it. A judgment or proposition may thus also be analyzed. The opposite of A., of course, is *Synthesis*; and the opposition of these terms is common in other branches of science as well as in Mental Philosophy. We speak of an *analytic* method in science, and of a *synthetic method*; and both are necessary, the one coming to the assistance of the other to secure against error, and promote the ascertainment of truth. The analytic method proceeds from the examination of facts to the determination of principles; while the synthetic method proceeds to the determination of consequences from principles known or assumed. The test of perfection in a theory is the harmony of the results obtained by the methods of A. and synthesis.

*Mathematical A.* in the modern sense of the term, is the method of treating all quantities as unknown numbers, and

## ANALYSIS.

representing them for this purpose by symbols, such as letters, the relations subsisting among them being thus stated and subjected to further investigation. It is therefore the same with Algebra, in the widest sense of that term, although the term algebra is more strictly limited to what relates to equations, and thus denotes only the first part of A. The second part of analysis, or A. more strictly so called, is divided into the A. of Finite Quantities, and the A. of Infinite Quantities. To the former, also called the Theory of Functions, belong the subjects of Series, Logarithms, Curves, etc. The A. of Infinites comprehends the Differential Calculus, the Integral Calculus, and the Calculus of Variations. To the diligent prosecution of mathematical A. by minds of the greatest acuteness, is to be ascribed the great progress both of pure and applied mathematics in the last two centuries.

The A. of the ancient mathematicians was entirely different from this, and consisted simply in the application of the analytic method, as opposed to the synthetic, to the solution of geometrical questions. That which was to be proved being in the first place assumed, an inquiry was instituted into those things upon which it depended, and thus the investigation proceeded, as it were, back, until something was reached which was already ascertained, and from which the new proposition might be seen by necessary consequence to flow. A reversal of the steps of the inquiry now gave the synthetical proof of the proposition. The modern mathematical A. affords a much more easy and rapid means of solving geometrical questions; but the ancient A. also afforded opportunity for the exercise of much acuteness, and was the chief instrument of the advancement of mathematical science until comparatively recent times. The invention of it is ascribed to Plato; but of the works of the ancients on geometrical A. none are extant, except some portions of those of Euclid, Apollonius of Perga, and Archimedes.

ANALYSIS, in Chemistry: that department of experimental science which has for its object the chemical disunion or separation of the constituents of a compound substance: thus, the resolution of water into its components hydrogen and oxygen; of common salt into chlorine and sodium; of marble into lime and carbonic acid; of rust into iron and oxygen; of sugar into carbon, hydrogen, and oxygen; and of chloroform into carbon, hydrogen, and chlorine—all are examples of chemical A. This department of chemistry, therefore, takes cognizance of the breaking down of the more complex or compound substances into their more simple and elementary constituents, and is antagonistic to *chemical synthesis*, which treats of the union of the more simple or elementary bodies to produce the more complex or compound. Chemical A. is of two kinds: *Qualitative* A., which determines the quality or nature of the ingredients of a compound, without regard to the quantity of each which may be present; and *quantitative* A., which calls in the aid of the balance or measure, and estimates the exact proportion, by weight or volume, in which the several con-



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stituents are united. Thus, *qualitative* A. ascertains and shows what water, marble, common salt, etc., are composed of; but it remains for *quantitative* A. to show that water consists of 1 part of hydrogen by weight united with 8 parts of oxygen; that marble is composed of 56 parts of lime, and 44 of carbonic acid; common salt, of  $35\frac{1}{2}$  parts of chlorine, and 23 of sodium; turpentine, of 30 carbon, and 4 hydrogen; chloroform, of 12 carbon, 1 hydrogen, and  $106\frac{1}{2}$  chlorine.

The divisions of inorganic (mineral) chemistry and organic (vegetable and animal) chemistry have led to a corresponding classification of chemical A. into *inorganic* A., comprehending the processes followed and the results obtained in the investigation of the atmosphere, water, soils, and rocks; and *organic* A., treating of the modes of isolation, and the nature, of the ingredients found in or derived from organized structures—viz., plants and animals. Both departments afford examples of what are called *proximate* and *ultimate* A. Proximate A. is the resolution of a compound substance into components which are themselves compound: thus, in inorganic chemistry, marble is resolved into lime (calcium united with oxygen) and carbonic acid (carbon with oxygen); while ultimate A. comprehends the disunion of a compound into its *elements* or the simplest forms of matter: thus, lime into calcium and oxygen; carbonic acid into carbon and oxygen; water into hydrogen and oxygen. Organic chemistry affords still better examples of each class: thus, ordinary wheat-flour, when subjected to proximate A., yields, as its proximate components, gluten (vegetable fibrin), albumen, starch, sugar, gum, oil, and saline matter; but each of these proximate ingredients is in itself compound, and when they undergo ultimate A., the gluten and albumen yield, as their ultimate elements or constituents, carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus; and the starch, sugar, gum, and oil are found built up of carbon, hydrogen, and oxygen.

Several other terms involving A. are in use in chemical treatises: thus, *Gas* A. is applied to the processes employed in the examination of the various gases, and is daily becoming of more importance and interest. *Metallurgic* A. includes the smelting of metallic ores, the assay of alloys of gold, silver, etc., and, in general, everything that pertains to the ultimate A. of metallic ores and compounds. *Agricultural* A. is restricted to the examination of manures, feeding-stuffs, and soils; *Medical* or *Physiological* A. to the investigation of blood, urine, and other animal fluids and juices, and the examination of medicinal compounds; while *Commercial* A. is the term used where great accuracy or nicety of detail is not required in an A., but where the commercially important constituents alone are determined, as the separation and recording of the amount of phosphates, ammonia, and alkaline salts in a sample of guano; the total amount of saline matter in a certain water; the iron in an ironstone, the lime in a limestone, etc.

**ANALYTICAL CHEMISTRY** is that department of chemistry which takes cognizance of analyses. The analytical chemist requires some peculiar apparatus, together with re-agents



## ANAM.

generally solutions, by the addition or reaction of which the nature and amount of the ingredients of a compound are determined. See CHEMISTRY.

ANAM, *ā-nām'*, or ANNAM, *ăn-nām'*: kingdom of Indo-China under a French protectorate; between n. lat.  $10^{\circ} 30'$  and  $20^{\circ} 30'$ , extending abt. 685 m. along the China Sea, while inland, toward the regions inhabited by the Moi hill-tribes and the Laos, the boundaries are ill-defined; bounded n. by Tonquin, and s. by French Cochin-China; about 32,100 sq. m., besides about 20,000 sq. m. of more or less dependent territory. There is much confusion in the use of the name A., which is often employed interchangeably with that of Cochin-China (q.v.); and sometimes the whole coast region from the n. boundary of Tonquin to the s. limit of Cochin-China is called A. French Cochin-China on the s. was detached from the empire of A. and seized by France 1863; the same fate befell Tonquin 1884.—As the watershed of A. lies not far back from the coast, there are no considerable rivers. The mean annual temperature at Hué is  $73^{\circ}$  F. The s.w. monsoon brings the dry season in Apr., and the n.e. monsoon the rainy season in Oct. In the n. part A. is rich in metals (g ld, silver, copper, mercury), in coal, and in precious stones. In the mountainous regions wild animals are numerous. The plant products are those of the tropics—rice, cotton, spices, sugar, indigo, ornamental woods, bamboos, etc. The mountainous region is covered with forests of useful and ornamental timber. Fishing is an important industry. The manufactures are unimportant—some silk and cotton weaving, and wood and metal (gold and silver) working: the people are unacquainted with the manufacture of steel.—The trade of A. is with China and France, and a little with Burma and Siam. For A., no statistics of commerce are obtainable separate from those of French Indo-China, viz.: A. Cambodia, Cochin-China, and Tonquin. Principal imports are rice, cotton, cotton fabrics, opium, and paper—all from China and Japan. Exports are the tropical products mentioned above, with bees-wax, ivory, lac: the yearly export of cinnamon bark amounts to about \$400,000, and of sugar abt. \$200,000. Trade is largely in the hands of Chinese. The ports of Turane, Qui Nhon, and Xuan Day are open to European commerce, and Turane has been conceded to France.—The inhabitants, Annamites, are mainly of Mongoloid stock, those of the mountain region notably taller, fairer, and more muscular than those of the coast land: these, though small of stature, are well proportioned: in habits they are indolent, but they are not without intellectual gifts. The principal food is rice; but like the Chinese, the Annamites are omnivorous and do not reject any kind of animal food. The speech of the people is monosyllabic, like the Chinese: the mode of writing was derived from China. There is no Annamese literature distinct from the literature of China. The popular religion is a form of spirit-worship combined with Buddhism; the learned, and in general the cultivated class, are Confucianists;

## ANAMIRTA—ANANTHERUM.

about 420,000 are Roman Catholics—for the most part descendants of emigrants from Macao and Japan after the suppression of the Jesuit missions.

The Chinese conquered Indo-China (including present A.) B.C. 214, and occupied the territory with colonics; the n. part, Tonquin; or Tongking, threw off the yoke A.D. 939, and in the first quarter of the 15th c. the entire coast region achieved independence of China, though that empire still asserted a suzerainty. The Portuguese entered the country 1517; later the Dutch established a trading-post at Hanoi. The French, 1789, enabled the emperor of A. to unite Tonquin and Cochín-China under his rule. The French seized the province of Saïgon (q.v.) 1861. By successive steps France encroached more and more on the dominions of the kings of A., till 1884, Aug. 25, the king of A., Tu-Duc signed a treaty (ratified 1886, Feb. 23), by whose terms A. was made a French protectorate. The king now (1903) reigning, Bun-Lan (b. 1879), succeeded his father Tu-Duc, 1889, Jan. 30. The capital is occupied by a French garrison. The whole of French Indo-China is under a gov.gen. with his seat at Hanoi and a 'resident' for each province. Under the French protectorate, the affairs of the kingdom of A. are administered in accordance with Annamite ideas of govt.; the king has absolute power. The throne is hereditary in practice, though the king may name whom he will for his successor. The king's council consists of six ministers. The protectorate in 1901 had a pop. of 6,124,000, of whom 4,000 were Chinese and 250 European.—See COCHIN-CHINA: TONQUIN: SAÏGON.

ANAMIR'TA: see COCCULUS INDICUS.

ANAMNESTIC, a. *ăn'ăm-nēs'tik* [Gr. *ana*, again; *mnēsis*, remembrance]: that aids the memory.

ANAMNIOTA, n. plu. *ăn-ăm'nĩ-ō'tă* [Gr. *an*, without; *am'nion*, the envelope of the foetus (see AMNION)]: the group of Vertebrata in which the embryo is destitute of an amnion.

ANAM'NIOT'IC, a. *-nĩ-ōt'ik*, of or pertaining to.

ANAMORPHOSIS, n. *ăn'ă-mōr'fō-sīs* or *-fō'sīs* [Gr. *ana*, again; *morphē*, a form or shape]: in *perspec.*, an image or picture on a plane or curved surface, which appears distorted or deformed from one point of view, and in just proportion from another. ANAMOR'PHOSIS or ANAMOR'PHISM, n. *-fīzm*, repetition of the same or similar forms; degeneration, as from a higher to a lower type; in *bot.*, any unusual appearance in the part of a plant.

ANA'NAS: see PINE APPLE.

ANANCHYTES, n. *ăn'ăn-kē'tēz* [Gr. *ana*, *chu'tē*, a mound]: a subdivision of fossil sea-urchins, distinguished by their elevated, helmet-like or mound-like form—known as 'shepherds' crowns' or 'fairly loaves.'

ANANTHERUM, n. *ăn-ăn'thēr-ŭm* [Gr. *an*, without; *anthēros*, flowery—from *anthos*, a flower]: in *bot.*, a fila-



## ANAPEST—ANAS.

ment without an anther. ANAN'THEROUS, a. -*ūs*, destitute of anthers.

ANAPEST, n. *ăn'ă-pĕst* [L. *anapæstus*, an anapest—from Gr. *ana*, *paĩo*, I beat]: a foot in poetry, consisting of three syllables—the first two short, the third long or accented—thus, — — —. AN'APES'TIC, a. -*tĭk*, pertaining to an anapest; also spelt *æ* for *e*.

ANAPHRODISIA, n. *ăn-ăf-rō-dĭz'ĭ-a* [Gr. *a*, without; *aphrodisia*, pert. to Aphrodite (q.v.)]: lack of sexual power or appetite; impotence. ANAPH'RODIS'IAC, a. pertaining to: N. in *med.*, an agent to allay sexual passion. ANAPHRODITIC, produced without the agency of sexual organs.

ANARCHY, n. *ăn'ăr-kĭ* [Gr. *a*, without; *archē*, government]: want of government; a state of lawless confusion in a country. ANARCHIST, n. *ăn'ăr-kĭst*, one who attempts to introduce disorder or confusion into a country. ANARCHIC, a. *ăn-ăr'kĭk*, or ANAR'CHICAL, a. -*kĭ-kāl*, lawless; confused; causing lawlessness. ANARCHISM (see NIHILISM).

ANARRHICHAS: see WOLF-FISH.

ANARTHROPODA, n. *ăn'ăr-thrōp'ō-dă* [Gr. *a*, without; *arthron*, a joint; *podes*, feet]: that division of annulose animals in which there are no jointed appendages or limbs, as worms, leeches, etc.

ANARTHROUS, a. *ăn-ăr'thrūs* [Gr. *a*, without; *arthron*, a joint]: in *gram.*, without the article; without legs or wings, as some insects.

ANAS, *ă'năs*: Linnæan genus of birds, included in the order *Palmipedes* (Web-footed birds) of the system of Cuvier, and divided by recent ornithologists into a number of genera; one of which, retaining the name *A.*, contains the true Ducks, and others contain the Swans (*Cygnus*), Geese (*Anser*), Scoters (*Oidemia*), Garrots (*Clangula*), Eiders (*Somateria*), Pochards (*Fuligula*), Shovellers (*Rhyncaspis*), Sheldrakes (*Tadorna*), Musk-ducks (*Cairina*), Red Heads (*Aythia*), Eiders (*Somateria*). These, with Mergansers (*Mergus*) and Flamingoes (*Phœnicopterus*), constitute the family *Anatidæ* of some ornithologists. Cuvier places them in a family called by him *Lamellirostres*, and distinguished by a thick bill, horny only at the nail-like extremity, and elsewhere invested with a soft skin, the edges furnished with laminæ, or with small teeth particularly adapted for the purpose of separating the food from the mud which is often taken with it into the bill. The laminæ, and a large and broad bill, are the chief characteristics of the old genus *A.* Some, as the true ducks, subsist in great part on small insects; others, as geese and swans, almost exclusively on vegetable food. The species are very numerous, distributed over all parts of the world, some of them very abundant in the polar regions. Some are important for their feathers or down, others for their flesh and for their eggs. A few have been domesticated, and are commonly kept for economic uses. See DUCK: GOOSE: SWAN: EIDER: BARNACLE: TEAL: etc.



## ANASARCA—ANASTASIUS.

ANASARCA, n. *ăn'ă-sâr'kă* [Gr. *ana*, throughout; *sarkē* or *sarka*, flesh]: general dropsy throughout the surface of the body. ANASARCOUS, a. *ăn'ă-săr'kūs*, dropsical.

ANASTASIUS I., Emperor of the East: 430–518, Jul. 8; crowned, 491, Apr. 11. He was born at Dyrrachium, Epirus, of an obscure family. The early portion of his life is unknown to history. On the death of Zeno, he was proclaimed emperor by the senate. He owed his elevation to Ariadne, widow of Zeno, whom he married. No monarch was ever more notable for his heresies. One of his generals, Vitalian, taking advantage of this unpopular feature of his character, revolted, ravaged Thrace, Scythia, and Moesia, compelled Anastasius to promise to recall the orthodox bishops whom he had banished, and secured for himself the title of governor of Thrace. Anastasius, however, had some good natural qualities, and did some praiseworthy actions. He suppressed the cruel and degrading spectacles where men fought with wild beasts, abolished the sale of offices, the tax on domestic animals, which had existed since the days of Vespasian, built a wall on the w. side of Constantinople to defend it from the incursions of the barbarians, constructed aqueducts in the city of Hierapolis, made a harbor at Cæsarea, and restored the 'pharos' or light-house at Alexandria.

ANASTASIUS II., Emperor of the East, mounted the throne in 713, but was deposed two years later by his mutinous soldiers. He retired to a cloister, and an attempt to recover his crown cost him his life in 719.

ANASTASIUS I., Pope, or rather Bishop of Rome. 398: d. 401, Dec. 14. He succeeded Siricius, one year after the death of Ambrose. Under his pontificate lived Chrysostom, Augustine, and Jerome. The most conspicuous act of his life was the reconciliation of the church of Antioch with that of Rome, after a schism of 17 years. Among the epistles attributed to A., two are obviously apocryphal; the one addressed to Nerenianus; the other, to the German bishops. The latter commanded the faithful to remain standing while the gospel was read in the churches, that neophytes should receive holy orders only on the recommendation of five bishops, and that the Manichæans, who had been expelled from Rome, should not be admitted into Germany. But the first of these epistles is later than the death of A., and the second earlier than his accession to the pontificate. A. was vehemently opposed to the doctrines of Origen, one of whose works (*Peri Archōn*, i.e., 'Concerning Principles') he condemned as heretical. For this he is praised by Jerome, who calls him a man of a holy life, of a 'rich poverty,' and of an apostolical earnestness. During his life, several councils were held, at Carthage, Constantinople, Ephesus, and Toledo.

There were three other popes of this name: ANASTASIUS II. (496–498): ANASTASIUS III. (911–913): and ANASTASIUS IV. (1153–1154). See POPE.

ANASTASIUS I., *an-as-tā'she-us*: Patriarch of Constantinople; b. in the second half of the 7th c., d. 753. He

## ANASTASIUS—ANASTOMOSIS.

favored the party of iconoclasts, or image-breakers. He owed his elevation to the emperor Leon, who exacted from him a pledge that he would assist in the destruction of the images. A. kept his word; but having made himself obnoxious to the new emperor, Constantine Copronymus, the latter (743) seized him, put out his eyes, and marched him through the hippodrome (race-course) mounted on an ass with his head to the tail.

**ANASTASIUS, SAINT**, surnamed **ASTRIC**: 954–1044: apostle of the Hungarians. A Frenchman by birth, he settled, after various changes, at the court of Stephen, Duke of Hungary, where he gained great influence, and was intrusted with the ecclesiastical organization of the land. All his energies were devoted to securing the triumph of the Christian faith.

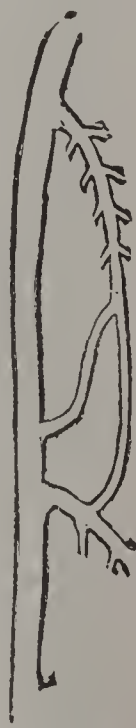
**ANASTATIC**, a. *ăn'ă-stăt'ik* [Gr. *ana*, up; *statos*, that stands]: a term applied to a method of printing from zinc plates.

**ANASTATICA**: see **ROSE OF JERICHO**.

**ANASTATIC PRINTING**: see **PRINTING**.

**ANASTOMOSE**, v. *ăn-ăs'tō-mōz* [Gr. *anas'tomōsis*, the formation of a mouth or aperture—from *ana*, through; *stoma*, a mouth]: to unite the mouth of one vessel to another, as of one vein to another; to inosculate. **ANAS'TOMO'SING**, imp. **ANAS'TOMOSÉD**, pp. *-mōzēd*. **ANAS'TOMO'SIS**, n. *-sīs*, in *bot.*, union of vessels; union of the final ramifications of the veins of a leaf; in *anat.*, the union of the branch of a vessel from the same trunk, or from other trunks. **ANAS'TOMOT'IC**, a. *-mōt'ik*, pertaining to: N. a medicine having the power to open the mouths of vessels.

**ANASTOMOSIS**, *ăn-ăs'tō-mō'sīs*: anatomical term used to express the union of the vessels which carry blood or other fluids; also, for convenience, the junction of nerves. The veins and absorbents anastomose to form large single trunks, as they approach their ultimate destinations. The arteries break up into small branches, for the supply of the tissues, and each small vessel, again, communicates with others given off above and below. At each large joint there is very free A., so that the safety of the limb beyond may not be entirely dependent on the single arterial trunk passing into it, exposed as it is to all the obstructive influences of the different motions of the limb. After the main artery has been permanently obstructed, the anastomosing vessels enlarge, so as to compensate for the loss; but after a time, only those whose course most resembles the parent trunk continue enlarged, and the others gradually regain their ordinary dimensions.



Arteries  
anastomos-  
ing.

An idea of the profusion of this anastomosing system may be formed from the fact, that if the innominate artery, or great vessel destined for the supply of the right upper half of the body, be tied, and those on the left side injected with size and



## ANATASE—ANATOLIA.

vermillion, the injection will flow freely into the arteries of the right arm, through branches as minute as they are numerous.

**ANATASE**, n. *ăn'ă-tăz* [Gr. *anatāsis*, a stretching forth]: a name for *pyramidal titanium ore*, of a dark indigo-blue, black, or brown; titanium dioxide; same as Octahedrite.

**ANATHEMA**, n. *ă-năth'ě mă* [Gr. and L. *anath'ēma*, a thing set apart for holy uses, anything devoted, especially to evil: Gr. *anath'ēma*, a votive offering—from *ana*, up; *tithēmi*, I put or place—*lit.*, placing or setting up gifts or offerings to God in His temple]: separation from the church; a curse; a separation for destruction. **ANATHEMATIZE**, v. *ă-năth'ě-mă-tiz'*, to pronounce a curse against; to excommunicate. **ANATH'EMATIZING**, imp. **ANATH'E MATIZED'**, pp. *-tīzēd'*. **ANATH'EMATIZER**, n. one who. **ANATH'EMATIZA'TION**, n. *-tī-ză'shŭn*, the act of pronouncing an anathema.

**ANATH'EMA**: a word originally signifying some offering or gift to Deity, generally suspended in the temple. Thus, Luke xxi. 5, the temple was adorned 'with goodly stones and gifts' (*anathemasi*). It also signifies a sacrifice to God; and, as the animals devoted to be sacrificed could not be redeemed from death, the word was ultimately used in its strongest sense, implying eternal perdition; Rom. ix. 3; Gal. i. 8, 9. In the Rom. Catholic Church, from the 9th c., a distinction has been made between excommunication and anathematizing; the latter being the extreme form of denunciation against obstinate offenders. The synod of Pavia, 850, determined that all transgressors who refused to submit to discipline, such as penance, should be not merely excommunicated, but anathematized, and deprived of every kind of Christian hope and consolation. Such a sentence could not be pronounced without the concurrence of the provincial bishops with their metropolitan. See EXCOMMUNICATION.

**ANATOLIA**, *ăn ă-tō'li-ă* [Gr. *Anatolē*, the East, i.e., from Constantinople]: modern name for Asia Minor (Turkish, *Anadolı*). It may be considered as coincident with the peninsula; the boundary-line on the e. between it and Armenia and Mesopotamia, not being natural, cannot be well defined. The area of the peninsula exceeds 200,000 sq. m. It constitutes the w. prolongation of the high table-land of Armenia, with its border mountain-ranges. The interior consists of a great plateau, or rather, series of plateaus, rising in gradation from 2,400 to 5,000 ft., with bare steppes, salt plains, marshes, and lakes; the structure is volcanic, and there are several conical mountains, one of which, the Agridagh (Argæus), with two craters, rises 13,000 ft. above the plain of Kaisarijeh, which has itself an elevation of between 2,000 and 3,000 ft. The plateau is bordered on the n. by a long train of parallel mountains, varying from 4,000 to 6,000 ft. high, and cut into groups by cross valleys. These mountains sink abruptly down on the n. to a narrow strip of coast; their slopes towards the interior are gentler and bare of wood. Similar is the character of the border ranges on the s., the ancient Taurus, only that



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they are more continuous and higher, being, to the n. of the Bay of Skanderun or Issus, 10-12,000 ft., and further to the w., 8-9,000 ft. The w. border is intersected by numerous valleys, opening upon the Archipelago, through the highlands of the ancient Caria, Lydia, and Mysia, to the n. part of which Mounts Ida and Olympus belong. Between the highlands and the sea lie the fertile coast-lands of the Levant. The rivers of A. are not considerable; the largest are the Yeshil Irmak (Iris), the Kisil Irmak (Halys), and the Sakkariah (Sangarius), flowing into the Black Sea; and the Sarabat (Hermus) and Minder (Mæander) into the Ægean.

The *climate* has on the whole a south-European character; but a distinction must be made of four regions. The central plateau, nearly destitute of wood and water, has a hot climate in summer, and a cold in winter; the s. coast has mild winters and scorching summers; while on the coast of the Ægean there is the mildest of climates and a magnificent vegetation. On the n. side, the climate is not so mild, nor the productions of so tropical a kind as on the w.; yet the vegetation is most luxuriant, and a more delightful or richer tract than the coast from the Sea of Marmora to Trebizond, is hardly to be found. The whole peninsula, however, is liable to earthquakes.

In natural history, A. forms the transition from the continental character of the East to the maritime character of the West. The forest-trees and cultivated plants of Europe are mingled with the forms peculiar to the East. The central plateau, barren, except where there are means of irrigation, has the character of an Asiatic steppe, more adapted for the flocks and herds of nomadic tribes than for agriculture; while the coasts, rich in all European products, fine fruits, olives, wine, and silk, have quite the character of the s. of Europe, which on the warmer and drier s. coast shades into that of Africa.

The political and social arrangements are much as in the rest of Turkey (q. v.). One peculiarity is the old Turkish system of vassal-dynasties, the Dere-begs (valley chiefs), who, like the feudal lords of the middle ages in Europe, are hereditary rulers and military commanders of their district, under the suzerainty of the sultan. The power of these feudal chiefs, however, was broken by Sultan Mahmud. See Tozer's *Turkish Armenia and Eastern Asia Minor* (1881).

A. has been variously divided, but usually into eight *vilayets* or governments, under governors-general, and each of these, again, into several *sandjaks*, or provinces, under lieutenant-governors. The vilayets are: 1. Khudavendkiar, in the n.w. including ancient Mysia, the w. part of Bithynia, and part of Phrygia; chief town Brussa; 2. Kastamuni, occupying the middle of the n. coast, including ancient Paphlagonia, the e. of Bithynia, and part of Pontus; chief town, Kastamuni; 3. Tarabosan or Trabezun (Trebizond), the ancient Pontus and Colchis; capital, Trebizond; 4. Aidin, in the s.w., the ancient Lydia, Caria, and Phrygia; capital, Ismir or Smyrna; 5. Konia, formerly Karamania, eastward from Aidin, the ancient Lycia, Pamphylia, Pisidia,

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Lycaonia, and part of Cilicia; chief town, Konieh (Iconium); 6. Adana, comprehending the rest of Cilicia, Kataonia, and part of Cappadocia; chief town, Adana; 7. Angora, the central part of the peninsula, ancient Cappadocia and Galatia, chief town, Enguri or Angora; 8. Sivas, e. from Angora, embracing parts of Pontus and Little Armenia; chief town, Sivas.

The inhabitants consist of the most various races. The dominant race are the Osmanli Turks, about 1,200,000, and are spread over the whole country; next are the Turkomans, belonging to the same stock, and speaking a dialect of the same language. These are found chiefly on the table-land, leading a nomadic life; there also live hordes of nomadic Kurds. Among the mountains e. of Trebizond are the robber tribes of the Lazes. The population of the towns, in addition to Turks, consists, in the w., chiefly of Greeks and Jews; and in the e., of Armenians; the non-Turkish population, with Europeans in the maritime marts, have the whole commerce of the country in their hands. Total pop. 9,123,432.

# ANATOMY.

**ANATOMY**, n. *ă-năt'ō-mĭ* [F. *anatomie*; L. *anato'miă*, Gr. *anat'ōmē*, dissection—from Gr. *ana*, up; *tomē*, a cutting—*lit.*, a cutting up]: the art of separating the different parts of a plant or of an animal; the art of dissection; the science treating of the structure and organization of living things; in *dramatic language*, a thin, meagre person; a skeleton. **ANATOMIZE**, v. *ă-năt'ō-mĭz'*, to separate the parts of an animal body. **ANAT'OMI'ZING**, imp. **ANAT'OMIZED**; pp. *-mĭzd*. **ANAT'OMIST**, n. one who is skilled in dissecting bodies. **ANATOMICAL**, a. *ăn'ă-tôm'ĭ-kăl*, pertaining to anatomy. **AN'ATOM'ICALLY**, ad. *-lĭ*. **ANATOMIZATION**, n. *ă-năt'ō-mĭ-ză'shŭn*.

**ANAT'OMY**: science of the form and structure of organic bodies; practically acquired by separation of the parts of a body, so as to show their distinct formation, and their relations with each other. It is generally understood to apply to the human body, while the A. of animals is styled **ZOOTOMY**, and that of plants, **PHYTOTOMY**. The investigation and comparison of the structures of the different kinds of organic bodies is styled **COMPARATIVE A.** Theoretical A. is divided into **GENERAL** and **SPECIAL**.

**GENERAL A.** gives a description of the elementary tissues of which the systems and organs of the body are composed, as preliminary to an examination of them in their combined state in the various organs; it also investigates their laws of formation and combination, and the changes which they undergo in various stages of life. This branch of study may also be styled **Structural** or **Analytical A.**, and has been developed only in recent times, especially by Bichât (1801) and Beclard, who have been followed by J. Müller, Goodsir, Mayer, E. H. Weber, Schwann, Valentin, and many others. In our day, microscopic investigation has been successfully applied to the study of elementary textures. See **HISTOLOGY**.

**SPECIAL A.** (styled **Descriptive** by the French writers) treats of the several parts and organs of the body in respect to their form, structure, and systematic connection or relation with each other. The arrangement of the several parts and organs in an order deduced from their similarity in structure or use, constitutes **SYSTEMATIC A.** According to this mode of study, essential as an introduction to physiology, A. has been divided, though not with scientific precision, into six branches of study. 1. *Osteology*, which treats of the bones, including the cartilages of the joints (*chondrology*).—2. *Arthrology*, which describes the ligaments, or bands, that unite the bones of various joints. The bones, with their cartilages and ligaments, form a framework, which supports the external soft parts, and within which the vital organs are suspended and protected from injury; they are also arranged in a mechanical system as instruments of motion.—3. *Myology* explains the system of the muscles, which, by their contractile power, serve to impart motion to the bones and joints; while, like the bones, they contribute to form the cavities of the body, and to protect the internal organs. Their structure also serves to produce the external shape and symmetry.—4. *Angeiology* describes the vessels



or ducts, with their complex network and ramifications spreading over most parts of the body, and divided into two great systems: (*a*), the blood-vessels with the heart, a fleshy organ propelling the blood through the pulsating vessels or arteries, from which it returns to the heart, after circulation through the veins; (*b*), the lymphatics, by which a certain fluid (lymph) is brought into union with the blood in the organs styled lymphatic glands, and is afterwards passed into the veins.—5. *Neurology*, or the doctrine of the nerves, describes the nervous system, as divided into, *first*, the two central masses of the brain and the spinal column; *second*, the ramifications of nerves running from the brain and spinal column to almost all points of the surface; and *lastly*, the order of nerves having a peculiar structure, and styled the ganglionic system of nerves.—6. *Splanchnology* describes the viscera or organs formed by combination of the distinct systems of veins, nerves, lymphatics, etc., and mostly situated in the cavities of the body. These are divided into five groups, viz.: (*a*), the organs of sensation—sight, hearing, smell, taste, and touch; (*b*), of voice and respiration—nostrils, mouth, larynx, trachea, and lungs, with the thyroid gland, the thymus gland, and the diaphragm; (*c*), digestive organs—the mouth, with its salivary glands, the throat, gullet, the stomach, the intestines, with the liver, spleen, and pancreas; (*d*), the urinary organs—kidneys, ureter, bladder, and urethra; (*e*), sexual organs of both sexes.

Special A. may be treated in another mode; by an arrangement made in accordance with natural divisions, or by imaginary lines dividing the body into several regions—as the head, the trunk, and the extremities. Again, the trunk may be subdivided into neck, thorax, and abdomen; and in each of the main regions, several subdivisions may be made. This system of arrangement may be styled **TOPOGRAPHICAL A.**, and is also known as **SURGICAL A.**, on account of its importance as the basis of operative surgery. It was the eldest of the Monros of Edinburgh University who first gave this branch of the study its due prominence.

The several parts and organs of the animal body are described under their proper titles.

*History of A.*—It is difficult to determine the date at which this science began to be cultivated, but it is probable that from the earliest times some persons took advantage of favorable circumstances to acquaint themselves with it. The Druids, who were at once the priests, judges, and physicians of the people, demanded from those who came for their advice human victims as sacrifices, and were themselves the executioners; and it is not unlikely that they availed themselves of these opportunities of acquiring anatomical knowledge. It is probable, says Galen, that Æsculapius, who excelled in the treatment of wounds, dissected animals for the instruction of his pupils. His descendants, the Asclepiades, cultivated A., or rather zootomy, and founded the three famous schools of Cos, Rhodes, and Cnidos. The rabbins tell us that, although among the Jews the touching of a dead body involved ceremonial uncleanness, they did not entirely neglect A.,

which they studied from the carefully preserved bones of their ancestors, and the necessary manipulations of embalming. They counted 248 bones, and 365 veins or ligaments, which division, according to the rabbins, has relation to the 248 precepts of the Mosaic Law that *command*, and the 365 that *forbid*.

Homer shows some anatomical knowledge in his description of wounds in the *Iliad*. Pythagoras first reasoned physiologically from observations made by him when in Egypt, where he witnessed the sacrifices, and also the Egyptian methods of embalming. Alcmeon of Crotona, a disciple of Pythagoras, first dissected animals with the view of obtaining comparative knowledge of human A. Democritus, who frequented the sepulchres, probably with anatomical views, practiced zootomy, and was engaged dissecting animals when visited by Hippocrates. Hippocrates II. (b. Cos. A.D. 35), descended in the eighteenth degree from Æsculapius, was the first author who treated A. as a science. He caused a skeleton of brass to be cast, which he consecrated to the Delphian Apollo, with the view of transmitting to posterity proofs of the progress he had made, and of stimulating others to the study of A. Aristotle (lived B.C. 384) does not appear to have dissected men: and he states that the parts of man are unknown to them, or that they possess nothing certain on the subject beyond what they can draw from the probable resemblance of the corresponding parts of other animals. He first gave the name *aorta* to the great artery.

Diocles (B.C. 380) was the first who treated of the proper manner of conducting anatomical examinations for purposes of demonstration. But no real progress in A. was made, owing to the researches being confined to animals, till the time of Erasistratus (b. Ceos about B.C. 300), the first to dissect human bodies. He obtained from Seleucus Nicanor and Antiochus Soter the bodies of criminals, and is said to have dissected some condemned to death while they were still alive. His writings are lost, but fragments are preserved in the writings of Galen. He made many discoveries, among others, of the lacteal vessels. Herophilus, who lived about the same time, was born at Carthage, but carried on his anatomical pursuits principally at Alexandria. He also is said to have dissected living subjects. Parthenius (lived B.C. 200) published a book, entitled *On the Dissection of the Human Body*. In the 1st c. of the Christian era, the dissection of human subjects was forbidden, under heavy penalties. Rufus the Ephesian (lived 112), under the empire of Trajan, taught A. in a more exact manner than had been hitherto done, and devised a more exact anatomical nomenclature. He made use of animals in his demonstrations, and mentions that 'of old they used for that purpose human bodies.'

Galen (131) dissected apes, as being most like human subjects, though he occasionally obtained bodies of children exposed in the fields, or of persons found murdered, which, however, he was obliged to dissect in secret. There was at this time no regularly prepared skeleton, as there was a law at Rome forbidding the use of dead bodies. Galen's writ-



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ings show a knowledge of human A. Soranus had extensive knowledge of A., derived from human subjects. Moschion had some anatomical illustrations engraved. Oribasius compiled more than 70 volumes, the 24th and 25th being on A., principally from Galen.

Nemesius, bishop of Nemesus, a town in Phœnicia, studied A. at the end of the 4th c., in which also Meletius lived, who wrote a complete treatise *On the Nature and Structure of Man*. Theophilus, a monk, published in the 7th c. a good abridgment of the A. of Galen.

A. made small progress among the Arabs, which is accounted for by their religion prohibiting contact with dead bodies. When the great Arabian physician, Rhazes, was about to be operated on for cataract, he discovered that the surgeon was ignorant of the structures of the eye, and refused to submit to the operation. Avicenna (980), born in the prov. of Khorasan, was a good osteologist, and described some structures not alluded to by Galen.

A. was now neglected for a long period, till Frederick II., king of Sicily (1194–1250), made a law forbidding any one to practice surgery without having first acquired some knowledge of A. He founded a chair, at the solicitation of Martianus, his chief physician, where the science was demonstrated for five years; students from all parts crowded to it, and some time after a similar school was established at Bologna—these two were largely attended, but no very material progress was made in A.

The University of Montpellier was founded by Pope Nicholas IV. in 1284, and the chair of A. was filled by Bernard Gordon with great distinction for ten years. He published a huge work, called *Lilium Medicinæ*.

Mundinus (b. Milan, 1315) was prof. of A. in Milan, and is considered the real restorer of A. in Italy. He publicly demonstrated it, and published a work which was the textbook in the academy of Padua two hundred years after its publication. Then came Guy de Chauliac, who first correctly described the humerus. Mathæus of Grado published several anatomical works about 1480. Gabriel de Zerbus, 1495, published a confused and imperfect work on A. at Verona. The science continued to be studied by surgeons such as Vigo (1516), Achillinus, and Berenger (Carpi), (1518), who boasted of having dissected at Bologna more than a hundred subjects. Reports were raised that he dissected living Spaniards, and he fled or was exiled to Ferrara.

André Lacuna (1535), Charles Etienne, Gonthier (1536), Massa, Driander (1537), Sylvius (1539), Levasseur, and Gesner, were celebrated for knowledge in A.; but especially Andrew Vesalius, b. 1514, who published a great work on A. before he was 28 years of age. He had the misfortune to open the body of a young Spanish nobleman whose heart was found still beating, and was obliged to make an expiatory pilgrimage to Jerusalem. In 1564, the Venetian senate recalled him to succeed, at Padua, the famous Fallopius, who had just died; on his return he was shipwrecked on the island of Zante, where he was starved to death.

William Horman of Salisbury wrote, 1530, *Anatomia Cor*



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*poris Humani* (A. of Human Body); then came Ingrassias, and others of less note.

Thomas Gemini of London, 1545, engraved upon copper the anatomical figures of Vesalius, which had appeared in Germany upon wood. Gemini suppressed the name of Vesalius, though using his figures and descriptions. Thomas Vicary, 1548, is said to be the first who wrote in English on A.; he published *The Englishman's Treasure, or the True A. of Man's Body*. John Ligæus, 1555, published an anatomical treatise in Latin hexameters. Franco (1556), Valverde, Columbus, and others, wrote works of great merit on A. In 1561, Gabriel Fallopius professed it with great distinction at Padua, and made many original discoveries.

In the 17th c., progress was rapid: Hervey, 1619, discovered the circulation of the blood, and the microscope was employed to detect the structure of minute vessels. Aselli, 1622, discovered and demonstrated the existence of the lymph-vessels; and his conclusions were supported by the investigations of Pecquet, Bartholin, and Olaus Rudbeck. The glandular organs were investigated by Wharton, while Malpighi, Swammerdam, and (in the following c.) the illustrious Ruysch, by the use of injections and the aid of the microscope, gave a new impulse to research in the minute structures. Eminent names in the history of A. are numerous in the 18th c. In Italy, which still retained its former pre-eminence, were Pacchioni, Valsalva, Morgagni, Santorini, Mascagni, and Cotunni; in France, Winslow, D'Aubenton, Lieutaud, Vicq d'Azyr, and Bichât, the founder of General A.; in Germany, the accomplished Haller and Meckel prepared the way for greater achievements in the 19th c.; in Great Britain, Cowper, Cheselden, Hunter, Cruikshank, Monro, and Charles Bell contributed to the progress of the science; while Holland was worthily represented by Boerhaave, Albinus, Camper, Sandifort, and Bonn. On the boundaries of the two centuries are the names of Sömmerring, Loder, Blumenbach, Hildebrand, Reil, Tiedemann, and Seiler; nearly all connected with practical medicine, which was benefited by their studies in A.

The necessity of a union of theory and practice has led to that zealous study of PATHOLOGICAL A. (the dissection and study of structures as modified by diseases) which has recently prevailed. The origin of this branch of A. may be traced back to ancient times in Egypt, where post-mortem examinations were sometimes made to discover the seat of disease and cause of death. In the medical writings of the Greeks, some anatomico-pathological observations are found. During the general revival of science in the 16th c., many notices of pathological A. occur. In 1507, Benevieni, of Florence, wrote the first book on this branch of science; and Bonet, in 1679, published his compilation of numerous observations. Still, these were only fragmentary indications of a possible science, and the facts stated were often very erroneously interpreted. Morgagni (1767), who must be regarded as the true founder of Pathological A., was worthily followed by Lieutaud, Sandifort, Hunter, Baillie, and others. Meckel the Younger, in Germany, in his study of malformations,

etc., paid little or no attention to practical applications of the science. The recent change of direction given to the study of Pathological A., which is now properly regarded as a means towards practical improvements in medicine, must be ascribed to Bichât and the pupils of Broussais, among whom may be mentioned the names of Laennec, Cruveilhier, Louis, Andral, Lobstein, Lebert, Virchow, Bennett, etc. In many European and American cities are societies devoted specially to the investigation of pathology.

COMPARATIVE A. has always preceded anthropotomy, or dissection of the human subject, but was first treated systematically as a distinct science by Cuvier and his pupil Meckel the Younger. Blumenbach, Tiedemann, Home, Blainville, Geoffroy St. Hilaire, Carus, Oken, Goethe, Owen, Goodsir, Müller, Wagner, Siebold, Bowman, Todd, Milne-Edwards, Von Baer, Gegenbaur, Kölliker, Remak, Czermak, Leydig, Frey, Schwann, Haeckel, Kowalevsky, Agassiz, Van Beneden, Burmeister, Carpenter, Allman, Sharpey, Allen Thomson, Owen, Huxley, and Flower may be named as eminent contributors to this branch of science: in the U.S., Wyman, Leidy, Agassiz, and others.

A. FOR ARTISTS is studied with reference to the effects produced by internal structure on the external form, and describes the organs, especially the muscles and tendons, not only in a state of rest, but also as modified by passion, action, and posture. Consequently, observation of the nude living form is required in this branch of study, which has been treated of by Errard and Genga (1691); and in modern times, by Lavater (1790), Camper (1792), Charles Bell (1806), Salvage (1812), Mascagni (1816), Koeck (1822), Gardy (1831), Fischer (1838), Salomon and Aulich (1841), Berger (1842), Seiler and Günther (1850), etc.

PRACTICAL A. includes *Dissection* (q.v.) and the making of *Preparations*. *Preparation* consists in dividing parts or organs, so that their respective forms and positions may be clearly shown. Organs or parts thus treated are styled *Anatomical Preparations* of bones, muscles, vessels, nerves, etc. For example, a bone-preparation is made by clearing away all muscular and other adhesions; the whole structure of the bones, thus prepared and bleached, when connected by wires in its natural order, forms an artificial *skeleton*.

For preparations of parts containing vessels with minute ramifications, injections are employed. Some colored fluid which has the property of gradually becoming solid is gently injected into the arteries or other vessels by means of a syringe. Formerly materials which required a certain degree of warmth to preserve their fluidity were used; but as these were attended with inconvenience, a great improvement was made by Shaw and Weber, who introduced the use of linseed-oil and turpentine, which, when mixed with certain metallic compounds in due proportions, form a fluid which, after a time, becomes solid in ordinary temperatures. Quick-silver and colored lime-water are also used for injection of the finer vessels. Preparations are either dried and varnished or preserved in spirit.

A series of such specimens. arranged in proper order,



## ANATOMY.

forms an *Anatomical Museum*. The valuable collections made by Ruysch, Rau, Loder, Walter, John and William Hunter, Meckel, Sömmerring, and Dupuytren, are all now public property. There is also a splendid collection in the Univ. of Edinburgh, collected and prepared for the most part by John Goodsir. The College of Surgeons of Edinburgh also has a very valuable museum of pathological preparations. As it is impossible to preserve thus all parts in their integrity for any great length of time, artificial copies in wood, ivory, and wax have been made with great exactitude, especially in Florence; and recently Anzou in Paris has employed *papier-mâché* for the same purpose. But, apart from dissections and preparations of the natural organs, the most general and available assistance in the study of A. is found in anatomical engravings and plates on wood and copper. This assistance was known in ancient times. Aristotle affixed to his works on A. some anatomical drawings, which have been lost. In the 16th c., the greatest artists—Leonardo da Vinci, Michael Angelo, Raphael, Titian, and Dürer—gave their aid in designing anatomical figures; but few of their works, in this department of art, have been preserved. Lately, lithography has been employed. Among the numerous extant illustrations of A. are the old works by Vasal (1543), Eustachius (1714), Bidloo (1685), Albin (1747), Haller (1743–56), and Vicq d'Azyr (1786–90). The present century has supplied works of first-rate excellence by Caldani (Venice, 1801–14), Mascagni (Pisa, 1823), Langenbeck (Göttingen, 1826), Bourguery and Jacob (Paris, 1832), and Arnold (Zürich, 1838). For general use are commended the plates of Loder (Weimar, 1803), Cloquet (Paris, 1826), Osterreicher (Munich, 1827–30), Weber (Düsseldorf, 1830), Bock (Leipsic, 1840), and D'Alton (Leipsic, 1848); in Surgical A., the works by Rosenmüller (Weimar, 1805); Pirogoff (Dorp, 1840), and Günther (Hamburg, 1844); in Pathological A., Meckel (Leipsic, 1817–26), Cruveilhier (Paris, 1828–41), Froriep (Weimar, 1828), Albers (Bonn, 1832), Gluge (Jena, 1843–50), and Vogel (Leipsic, 1843); in Comparative A., Carus (Leipsic, 1826), and Wagner (Leipsic, 1841). Among English works may be mentioned those by Lizars, Jones, and Richard Quain, in Special A.; by Morton and MacLise, in Surgical A.; and by Baillie and Bright in Pathological A.—See ANTHROPOLOGY.

ANATOMY, in Law, legal status of the practice of human dissection. No state of the American Union has enacted statutes to regulate this; therefore the practice of anatomical dissection is in this country restricted only by the common law and police regulation. To take up a body for the purpose of dissection is a misdemeanor for which the offender may be indicted at common law. In Cal., Conn., La., O., and Vt., the laws recognize the interest of the relatives of a deceased person in his body: in those states, therefore, the relatives have a remedy in a civil action against any one who should against their will dissect the body. The statutes of Great Britain provide that, in the absence of a contrary wish expressed by the deceased or by a surviving relative,



an executor may submit the body of a deceased person to dissection; but where the deceased has directed this to be done, the statutes recognize the right of near relatives to object. The law does not apply to any *post-mortem* examination, required or directed by any competent public authority. It is understood that this system has abated the evil that it was designed to meet—the practices of ‘burking’ and ‘resurrectionism;’ under it, the supply of cadavers of persons dying friendless, in poorhouses, hospitals, and elsewhere, appears to be sufficient for the medical schools.

ANATROPAL, a. *ăn-ăt'rō-păl*, or ANATROPOUS, a. *ăn-ăt'rō-pūs* [Gr. *ana*, up or over; *trō'pē*, a turning]: in *bot.*, an inverted ovule, the hilum and micropyle being near each other, and the chalaza at the opposite end.

ANAXAGORAS, *ăn-ăks-ăg'ō-răs*: one of the most eminent philosophers of the Ionic school: B.c. 500–428; b. Clazomenæ, Ionia. He belonged to a wealthy and distinguished family, which may have enabled him to devote himself exclusively to intellectual pursuits. Yet he does not seem to have entered into the possession of his property, but left it to his relations. When only twenty years of age he went to Athens, where he gained high reputation, and had several illustrious pupils, among whom were Pericles, Euripides, Socrates, and Archelaus. But at last, being accused of impiety towards the gods, he was condemned to death. His sentence, however, was commuted into banishment for life, through the eloquence of Pericles. He withdrew to Lampsacus on the Hellespont, where he died in the 73d year of his age. The old man was accustomed to say proudly, in his exile: ‘It is not I who have lost the Athenians, but the Athenians who have lost me.’ When on his death-bed, the magistrates of the town asked what funeral honors he desired: ‘Give the boys a holiday,’ was the quaint reply of the sage; and for several centuries the day of his death was commemorated in all the schools of Lampsacus.

It is not easy to ascertain the opinions of A. in philosophy. Fragments merely of his works have been preserved, and even these are sometimes contradictory. It is certain that he had a deeper knowledge of physical laws than any of his predecessors or contemporaries. The absurdities of opinion which are attributed to him are no proof of the contrary, for, in his time, any attempt to explain even a moderate number of the phenomena of nature was sure to be attended with what everybody now sees to be extravagant fictions. He believed the heavens to be a solid vault; the stars to be stones thrown up from the earth by some violent convulsion, and set on fire by the ether which ever burns in the upper regions of the universe; the milky-way to be the shadow of the earth; that the soul had an ærial body; that the sun was a burning mass of stone, larger than the Peloponnesus. But he also arrived at some tolerably accurate conclusions regarding the cause of the moon’s light, of the rainbow, of wind, and of sound. His great contribution to ancient philosophy, however, was his doctrine as to the origin of all

things. He held that all matter existed originally in the condition of atoms; that these atoms, infinitely numerous, and infinitely divisible, had existed from all eternity, and that order was first produced out of this infinite chaos of minutiae through the influence and operation of an eternal intelligence (Gr. *nous*). He also maintained that all bodies were simply aggregations of these atoms, and that a bar of gold, or iron, or copper, was composed of inconceivably minute particles of the same material; but he did not allow that objects had taken their shape through accident or blind fate, but through the agency of this 'shaping spirit' or *Nous*, which he described as infinite, self-potent, and unmixed with anything else. 'Nous,' he again says, 'is the most pure and subtle of all things, and has all knowledge about all things, and infinite power.' A.'s theory is thus only one step from pure theism. The work of the Eternal begins with providence, not with creation.

The fragments of his works have been collected by Schaubach (Leipsic, 1827), and by Schorn (Bonn, 1829). See Zévort, *Anaxagore: sa Vie et sa Doctrine* (Paris, 1843).

ANAXIMANDER, *a-näks-ï-män'dér*: B.C. 610-546; b. Miletus: Greek mathematician and philosopher, son of Praxiades, and disciple and friend of Thales. His principal study was mathematics. He is said to have discovered the obliquity of the ecliptic, and certainly taught it. He appears to have applied the *gnomon*, or style set on a horizontal plane, to determine the solstices and equinoxes. The invention of geographical maps is also ascribed to him. As a philosopher, he speculated on the origin (*arche*) of the phenomenal world, and this principle he held to be the infinite or indeterminate (*to apeiron*). This indeterminate principle of A. is generally supposed to have been much the same with the chaos of other philosophers. From it he conceived all opposites, such as hot and cold, dry and moist, to proceed through a perpetual motion, and to return to it again. Of the manner in which he imagined these opposites to be formed, and of his hypothesis concerning the formation of the heavenly bodies from them, we have no accurate information. It seems, however, that he did not believe in the generation of anything in the proper sense of the word, but supposed that the infinite atoms or units of which the *arche*, or primary matter, is composed, merely change their relative positions in obedience to a moving power residing in it. Some of his particular opinions were, that the sun is in the highest region of the heavens, is in circumference twenty-eight times greater than the earth, and resembles a cylinder from which flow continual streams of fire; that eclipses are caused by the stopping of the openings from which the fire flows; that the moon is also a cylinder, nineteen times greater than the earth; and that the moon's phases are caused by obliquity of position, and eclipses by complete turning round. He taught that the earth is of the form of a cylinder, and that it floats in the midst of the universe, that it was formed by the drying up of moisture by the sun, and that animals are produced from moisture.



## ANAXIMENES—ANCELOT.

**ANAXIMENES**, *ăn'ăks-îm'ê-nêz*: lived abt. B.C. 556; b. Miletus: Greek philosopher. He held *air* to be the first cause of all things, or the primary form of matter, from which all things are formed by compression.

**ANBURY**, n., or **ANBERRY**, n. *ăn'běr-rĭ* [AS. *ampre* or *ompre*, a crooked swelling vein: OE. *amper*, an inflamed tumor]: under these names, and the name *angle-berry*, are included, in veterinary language, both warts and molluscous tumors; in *bot.*, a warty condition or swelling on the roots of such plants as turnips, cabbage, and generally the Cruciferae, as well as in other plants, caused by insects—a disease sometimes destroying the turnip-crop of entire fields. It is sometimes called *Club-root*, because of the knobs or tubercular excrescences which form upon the root. The root, instead of swelling into one turnip of good size, generally becomes divided into a number of parts, each in some small degree swelling separately by itself; whence the popular name, *Fingers and Toes*. The growth of the plant is arrested; the root becomes woody; the excrescences rot, and emit most offensive effluvia, which, however, appear peculiarly attractive to insects of various kinds; and, accordingly, eggs and maggots in abundance are soon to be found in them. It has been very generally supposed, though it is not known, that these insects, or some of them, are the cause of the disease; possibly they are attracted by the diseased state of the plant. It appears probable that the disease is in some measure owing to peculiarities of soil, or of manure, and to the too frequent repetition of turnip-crops upon the same field. A much greater frequency of repetition, however, can be safely practiced in some districts, or in some fields, than in others. In some instances the liberal application of lime has been found advantageous as a preventive of A. See **TURNIP**.

**ANCAS'TÉ**: town of the Argentine Republic, S. Amer., prov. of Catamarca, 23 m. n.e. from Catamarca. Pop. about 8,000.

**ANCELOT**, *ônss-lo'*, **JACQUES - ARSÈNE - POLYCARPE-FRANÇOIS**: 1794, Feb. 9—1854, Sep. 7: French poet, b. Havre, where his father was clerk of the Chamber of Commerce. A. was employed, until the revolution of July, in the government service. His reputation was first established in 1819 by his tragedy of *Louis IX.*, which was played fifty nights in succession, and procured him a pension of 2,000 francs from the king. His next piece, *The Mayor of the Palace* (1823), was not so well received. In 1824, appeared his *Fiesque*, a work which exhibited the great skill of the author in adapting a master-piece of Schiller to the French stage. In 1825, he pub. an epic poem in six cantos, *Marie de Brabant*; and in 1827, a clever and graceful work, partly prose and partly verse, entitled *Six Months in Russia*, besides a novel in four vols., *The Man of the World*. *Olga*, a drama, was pub. 1828; and *Elizabeth of England*, 1829. In 1834, appeared *Les Emprunts aux Salons de Paris*. The revolution of July deprived him of his pension, and also of his situation as librarian of Meudon; and for the next ten



## ANCESTOR—ANCHOR.

years he was compelled to support himself and family by the concoction of numberless *vaudevilles*, dramas, comedies, anecdotes, etc., sometimes of very questionable morality. In 1841, the French Academy chose him as the successor of Bonald. Shortly after appeared his *Familiar Letters* (*Epîtres Familières*), a collection of satires as remarkable for freshness of epigram as for grace of style and richness of versification. In 1848, he published *La Rue—Quincampoix*.

A.'s *chef-d'œuvre*, *Louis IX.*, is a work of genius, the versification is correct, elegant, and harmonious, the manners and characters of the period are delineated with great fidelity and brilliancy; the plot is skilfully constructed; and some of the scenes are contrived with singular felicity.

ANCESTOR, n. *ăn'sēs-ter* [L. *antecessor*, he that goes before—from *ante*, before; *cessus*, gone; F. *ancestre*]. a forefather; a progenitor; a woman is called an ANCESTRESS. ANCESTRAL, a. *ăn-sēs'trāl*, relating to or descending from ancestors. ANCESTRY, n. *ăn'sēs-trī*, birth; descent; a series of ancestors.

ANCHOR, *ăng'ker* [L. *an'chōra*: Gr. *ang'kūra*]: an iron grappling instrument which, when dropped on the sea-bottom by means of a cable or chain, keeps a ship from drifting; any firm stay or support. V. to stop at; to fix or rest on. AN'CHORING, imp. ANCHORED, pp. *ăng'kērd*. ANCHORAGE, n. *ăng'ker-āj*, a place where a ship can anchor. AN'CHORABLE, a. *ă-bl*, fit for anchorage. To DROP OR CAST ANCHOR, to sink an anchor into the sea to keep the ship from drifting. To WEIGH ANCHOR, to raise the anchor from the sea-bottom. ANCHOR COMES HOME, when it drags by the violence of the wind, by a heavy sea, or by the force of a current. AT ANCHOR, or RIDING AT ANCHOR, when the ship is kept from drifting by the anchor having a proper hold on the sea-bottom. ANCHOR-ICE: see GROUND-ICE.

ANCHOR: the A. operates by digging into the bottom as the ship pulls on it. The mere dead weight of the A. is of comparatively little effect except as regards the strength of shank, arms, and other parts, and the size of the same, which factors involve the question of the weight.

The original A. was undoubtedly a stone. The idea of giving it some form of arm or extensions to catch the bottom was evolved at an early date. Some early anchors were made of wood weighted with stone to make them sink. The Greeks were supposed to have been the first to use iron anchors. Originally they were like a large hook, having only a single arm to catch into the bottom. Next a second one was added, thus approaching the modern shape. The absence of a cross piece or stock made them very inefficient. The early ships carried several anchors. On the ships of the ancient Greeks, one A. was reserved for extreme peril, and termed the 'sacred anchor.'

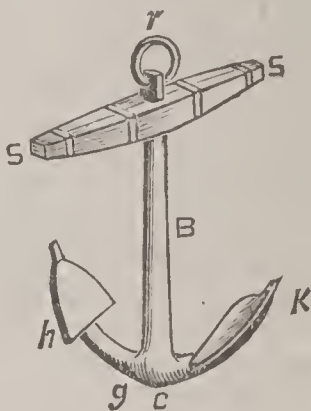
After the A. had reached approximately its present shape, no great improvement was made in its construction, till about the beginning of the 19th c., when a clerk named Pering, in the Plymouth, England, shipyard, published a

ANCHOR.

book arguing from the number of broken anchors that something was wrong in the construction, and proposing a new shape with curved arms and of generally improved construction. Numerous improvements have since been introduced. The Brit. govt. has subjected anchors to exhaustive tests for determining their strength; and the regulation A. has been brought to great perfection. It is now comparatively a rare thing for an A. to break; formerly it was common.

In the cut, B is the *shank* of the anchor, generally round in section, but square where it goes through the stock, and this part is termed the *square*: *g* is one of the *arms*; the juncture of arm with shank is termed the *throat* or *crutch*. At the end of each arm is the *fluke* or *palm*; the small portion, *k*, of the arm projecting beyond the fluke is termed the *point*, *peek*, *pee*, or *bill*. The portion of the arm immediately back of the fluke is termed the *blade*. The portion *c* of the arms which first touch the ground or water as the A. is lowered is termed the *crown*: *r* is the *ring*; often a shackle is substituted, sometimes termed the *jew's harp*: *s s* is the *stock*. This in the A. shown in the cut is made of two beams of wood, notched out at the centre to receive the square of the shank. They are cut so as not to fully meet at the centre. Hoops are then driven on so as to draw the halves together and firmly clamp the square between them. Sometimes a single piece of wood is used for the stock, with a square hole through which the shank is thrust. In smaller anchors a hole is often forged through the shank, through which a wooden stock is thrust and fastened by wedging or otherwise. In modern anchors the tendency is to use iron stocks. Such a stock passes through a hole in the square of the shank: a collar prevents it from going through, and a pin, the *forelock*, is driven through a hole in the stock on the other side of the square of the shank, to prevent it receding. A washer encircles the stock between the forelock and square. It is usual to have a bend at the end of an iron stock, so that when the forelock is driven out, the stock can be drawn back and stowed against the shank, without being fully withdrawn. Such anchors are termed *kedges*.

The action of an A. is simple. The stock, lying in a plane at right angles to that of the flukes, keeps one fluke pointing toward and resting against the bottom. If, as the A. reaches the bottom, the flukes rest flatwise on it, the moment the ship drags the anchor the stock *cants* the anchor, that is, throws it over with the point of an arm resting on the bottom. Then, as the ship drags farther, the fluke begins to sink it. Its inclined face draws it down, and soon the whole arm or more is buried and the grip is secured. The most favorable angle for the fluke is about  $45^{\circ}$  with the axis of the shank.



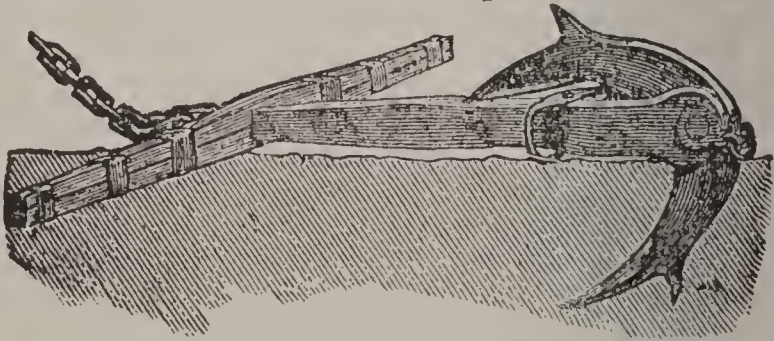


## ANCHOR.

In the old navy regulations, the anchors of a ship were termed according to their relative size the 'best bower,' 'small bower,' 'sheet,' and 'stream.' Lloyd's maritime insurance rules prescribe for merchant vessels the number and weight of anchors to be carried. Thus a 200-ton vessel has to carry three bowers weighing altogether  $23\frac{1}{2}$  cwt., one stream, and one kedge; vessels from 250 to 3,000 tons must have an additional kedge, and those above 2,000 tons an additional bower. Steamers are required to carry the weight of anchors corresponding to sailing vessels of two-thirds their capacity. Very elaborate tables are given to cover the different sizes and classes of vessels. The above figures give merely an example of the requirements.

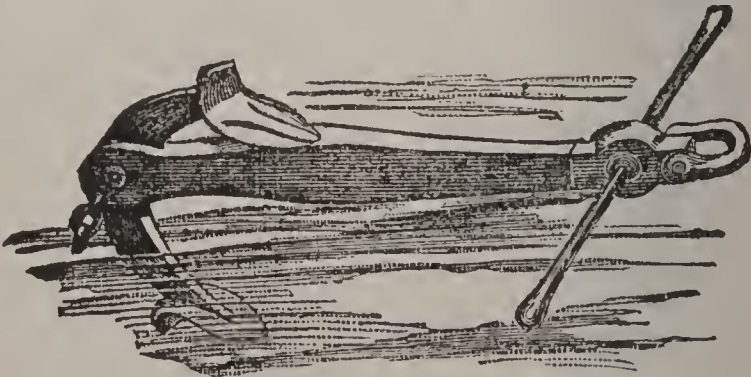
The largest A. ever made is said to have been constructed for the *Great Eastern*. Exclusive of the stock, it weighed 8 tons. Its dimensions were: length of shank 20 ft. 6 in.; length of wooden stock, 19 ft. 6 in.; trend of arms 7 ft. 4 in.

One of the troubles incident to the use of anchors is fouling. this consists in the cable winding around the shank or arm, and preventing the anchor from holding. Even a turn around the stock interferes with its proper action. To prevent this trouble and to obtain other advantages many kinds of anchors have been invented and patented. These gener-



Porter's Anchor at Work.

ally use a swivelled or tumbling arm or arms. Porter's A. is characterized by this feature, both arms being in one piece swivelled at the crown. On the back of each arm be-



Trotman's Anchor at Work.

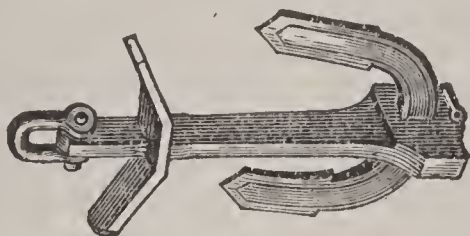
hind the fluke is a projection, called the *toggle*: this catches in the ground if the arm lies against the shank, and draws the arm out toward its holding position. Trotman's A., also



## ANCHOR.

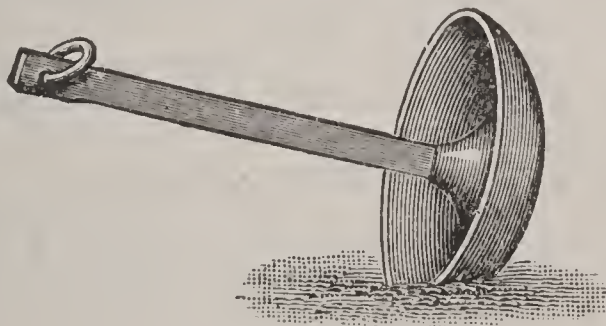
illustrated, is a modification of Porter's. Martin's A. is of another type. Its arms are pivoted at right angles to the position shown in Porter's A.; the palms also are at right angles to the usual position. In action both flukes take hold at once. The play of the arms is restricted by a stop.

The Brit. admiralty test for an A. consists in holding it by the shackle while a strain equal to  $\frac{1}{3}$  the breaking strain is applied at a point on each arm  $\frac{1}{3}$  its length from the point. It must show no fracture, and if it springs, must return to its original shape when released. A good A. may yield half an inch and return to its original shape.



Martin's Anchor.

The A. is ordinarily kept outside the ship, the shackle fastened to a beam, the cat-head projecting outward from the quarter, so as to overhang the water. The other end of the A. is drawn in toward the rail, the fluke sometimes resting in a sort of cap or depression in an iron plate on the rail. Variations in the disposition obtain. Many modern anchors are without stock—these are termed stockless anchors. When such are used, a common practice is to have the hawse-hole so large and of such shape that the shank of the A. is drawn into it, the arms and flukes remaining outside, and resting flat against the ship's sides.



Mushroom Anchor.

There are other special types. The mushroom A. consists of a straight shank without stock, to whose outer end is attached a round, shallow basin or cup. This acts by digging its way into the bottom as the A. is dragged. It is exceedingly secure, cannot foul, and is used on almost all lightships. It is also used extensively for buoys. Sometimes a short screw with one or two wide, thin, helical flanges or threads is used as an A.: it is screwed down into the bottom by a key which is subsequently removed. A cable is attached to it by a swivel. The last described anchors are termed *mooring anchors*. There are other types of mooring anchors in use.



Mooring Anchor.

## ANCHORAGE—ANCHORITES.

The length of cable from a ship to her A. is the *scope*. The greater the scope the more secure the holding. For ordinary weather three times the depth of the water is sufficient scope.

A *sea-anchor* is a contrivance for keeping a ship's head to the wind. It consists of a drag designed to take hold of the water as the ship drifts. It is attached by a long cable, perhaps 100 fathoms, to the ship's bow, and as the vessel is driven by the wind the sea-A. keeps a strain on the bow. It is often made of a sail spread on yards and ballasted so as to float vertically. An umbrella held immersed with its stick horizontal and dragged through the water illustrates the action. Another form is made of three spars lashed in the form of a triangle, over which is spread a canvass tightly roped, while beneath is a network of ropes to which is attached a heavy iron bar, small anchor, or other weights: this form, level with the surface of the sea, offers no resistance to the wind.

**ANCHORAGE:** a due or toll levied on the owner or captain of a ship for permission to cast anchor at special anchoring-grounds. In most instances it is payable to the state; but sometimes the right is vested in corporate bodies or in individuals. The tariff varies greatly, depending on the size of the ship, or on the value of the cargo, according to circumstances. In most cases, where a vessel is driven into port by stress of weather, and does not discharge cargo there, it is exempt from this toll. Shore-dues differ from A. chiefly in the fact that a vessel pays duty on entering a certain port or harbor, whether she anchors or not; and, by a singular anomaly, these duties are in certain instances vested in the corporation of an inland town, many miles distant from the port in question.

A. is a term also sometimes applied to the whole suite of anchors belonging to a ship; and still more frequently it has the same sense as anchor-ground (q.v.).

**ANCHORET**, n. *ăng'kō-rět*, **AN'CHORITE**, n. *-rīt*, or **ANACHORET**, n. *ăn-ăk'ō-rět* [Gr. *an'achōrētēs*, one who retires—from *ana*, up, back; *chorē'ō*, I retire]: a hermit; a religious recluse. **ANCHORETIC**, a. *ăng'kō-rět'ik*, or **AN'CHORET'ICAL**, a. *-i-kăl*, pertaining to a hermit or his mode of life.

**ANCHOR-GROUND:** part of the bed of the sea, or of a river, suitable for anchoring. It must not be too deep, or the cable will bear too perpendicularly, and will be likely to drag the anchor out of the ground. It must not be too shallow, or the ship's bottom will be exposed to the hazard of striking at low-water, or when the sea is rough. It must not be too rocky, or the anchor will be liable to break its flukes by hooking into jagged rocks, and the cable to be severed by rubbing against rocky edges. Thus, a combination of favorable circumstances is necessary for the selection of a good anchoring-ground.

**ANCHORITES**, *ăng'kō-rīts*, or **ANCHORETS**, *-rêts*: hermits who began to appear in the Christian Church in the 3d c.,



## ANCHOVY.

living in solitude, and not, like the monks or cenobites, in communities. During the first two centuries, Christians generally thought it enough to withdraw from the world by refusing to participate in heathen festivals and amusements; but extreme views became gradually prevalent, and were connected with a belief in the merit of celibacy, of abstinence from particular kinds of food, of self-inflicted tortures, etc. The persecutions to which Christians were subjected drove some into the solitude of deserts; afterwards, the glory of a life spent in loneliness and austerity became a substitute for that of the martyr's death. The general corruption of society also caused many earnest and well-meaning persons to flee from it; the Ascetics (q.v.) first set the example of retiring from cities to rural districts and villages; the A. went further, and sought to withdraw themselves altogether from mankind; and though the reputation of sanctity which was connected with a life of solitude constituted its chief attraction to some, there can be no doubt that many chose it in the hope of thereby attaining to real sanctity. Many of the A. voluntarily subjected themselves to the vicissitudes of the weather, without proper habitation or clothing, restricted themselves to coarse and scanty fare, wore chains and iron rings, and even throughout many years maintained painful postures, such as standing on the top of a pillar. See STRYLITES. Paul (q.v.) the Hermit, and Antony (q.v.), were among the first and most celebrated A. The A. were not able always to preserve their solitude unbroken. The fame of their sanctity drew many to visit them; their advice was often sought; and the number of their visitors was much increased by the belief that diseases—particularly mental diseases—were cured by their blessing. Sometimes, also, they returned for a short time to the midst of their fellow-men to deliver warnings, instructions, or encouragements, and were received as if they had been inspired prophets or angels from heaven. The number of A., however, gradually diminished, and the religious life of convents was preferred to that of the hermitage. The western church, indeed, at no time abounded in A. like the eastern, and perhaps the reason may in part be found in the difference of climate, which renders a manner of life impossible in most parts of Europe that could be pursued for many years in Egypt or Syria.

ANCHOVY, n. *ān-chō'vī* [Sp. and Port. *anchova*: Sic. and Geno. *anciova*], (*Engraulis Enchrasicholus*): a small fish, about a span long, much esteemed for its rich and peculiar flavor. It is not much longer than the middle finger, thicker in proportion than the herring, to which it has a general resemblance; the head is sharp-pointed, and the under jaw much shorter than the upper; the scales large, silvery, and easily removed, the tail deeply forked. It is occasionally found on the British coasts, and is said to be not at all uncommon on the coast of Cornwall in the latter part of summer and beginning of autumn. It seems to have been formerly more abundant than it now is in the British seas, as several acts of parliament, of the reign of William and Mary, regulated the A. fisheries. It occurs on the coasts of the Baltic and of Greenland and abounds in the Mediter-



## ANCHOVY PEAR—ANCHYLOSIS.

anean and on the Atlantic coasts of Spain, Portugal, and France, where extensive and very productive fisheries are carried on, particularly in May, June, and July, when the shoals of anchovies leave the deep seas, and approach the shores for the purpose of spawning. They are fished during the night, and are attracted to the boats by fires. They are salted in small barrels and are much used for sauces,



Anchovy.

etc. The Romans made from them a highly-valued sauce called *garum*.—*Sardines* (q.v.), are often sold as anchovies.—The genus *Stolephorus* (Lacépède) now displaces *Engraulis* (Cuvier), and is type of a new family, *Stolephoridae*. A true Anchovy (*Stolephorus Browni*), mature length 6 in., with sharp, silvery, lateral band, abounds from N. J. south. At Fort Macon it is called sardine; in New York sold sometimes as white bait instead of young herring. Two smaller species range from Cape Cod s., and several others on the Pacific coast.

**ANCHOVY PEAR** (*Grias cauliflora*): a tree, the only known species of a genus somewhat doubtfully referred by Lindley to his order *Barringtoniaceæ* (more generally regarded as a sub-order of *Myrtaceæ*, q. v.). It grows in boggy places in the mountainous districts of Jamaica and other West Indian islands, attains a height of fifty ft., and has great oblong leaves two or three ft. in length. The flowers are numerous, on short peduncles, large and whitish, the corolla consisting of four petals, and the calyx 4-cleft. The fruit is an ovate drupe, crowned with the persistent calyx, the stone marked with eight ridges. The fruit is pickled and eaten like the East Indian mango, which it much resembles in taste.

**ANCHUSA**: see ALKANET.

**ANCHYLOSIS**, or **ANKYLOSIS**, n. *äng'kĩ-lō'sis* [Gr.—from *ang'kuloun*, to crook or stiffen]: the immovable union of two bones by means of osseous matter. **ANCHYLOSED**, a. *äng'kĩ-lōzd*, fixed. **ANCHYLOTIC**, a. *äng'kĩ-lōt'ik*, pertaining to.

**ANCHYLOSIS**, in Surgery: a stiffness in any joint. It is usually the result of disease, which, having destroyed the articular cartilages, leaves two bony surfaces opposed to each other. The reparative powers of nature cause a union to take place by means of granulations between them. This bond of union may become osseous, so as to render the joint perfectly rigid, or it may continue membranous, allowing of a certain amount of motion. Some joints, especially the elbow, are very liable to this stiffness; and in the knee or hip-joints, this osseous A. is reckoned the most favorable

## ANCIENT—ANCIPITAL.

termination to disease, as the limb can then afford a rigid support for the trunk. Joints, stiff through a membranous A., may be forcibly bent, and the bond of union ruptured, so as to restore mobility, or allow of their being placed in a convenient position. A. of the joints between the ribs and the vertebræ is common in advanced age; and there are some cases on record of universal A. of all the joints. A case occurred in 1716 of a child only twenty-three months old with all its joints thus stiffened; and there are in various museums specimens of adult bodies in this condition.

ANCIENT, a. *ān'shēnt* [F. *ancien*, old—from mid. L. *antiānus*, old—from L. *ante*, before: It. *anzia'no*]: old; what is long past; belonging to former times. N. [corruption of *ensign*]: in *OE.*, the flag or streamer of a ship; the bearer of an ensign. AN'CIENTS, n. plu. those who lived in old times. AN'CIENTLY, ad. *-lī*, in old times: AN'CIENTNESS, n. ANCIENTRY, n. *ān'shēnt-rī*, ancient lineage.

ANCILE, n. *ān-sī'lē* [L.]: in *anc. Rome*, the sacred shield of Mars, said to have fallen from heaven.

ANCILLARY, a. *ān'sīl-lēr'ī* [L. *ancil'la*, a maid-servant]: subservient; subordinate, as a handmaid.

ANCILLON, *ōn-se-yōn'*, CHARLES, son of David: b. Metz, 1659, July 28, d. Berlin, 1715, July 5. He is known by his writings: *L'Irrévocabilité de l'Edit de Nantes* (1688), and *Histoire de l'Etablissement des Français Réfugiés dans les Etats de Brandebourg* (1690).

ANCILLON, *ōn-se-yōn'*, DAVID: d. 1692: one of a French family who, after the revocation of the Edict of Nantes, migrated from Metz into Prussia. He studied theology at Geneva, was afterwards pastor of the French Reformed colony at Hanau, and died in Berlin.

ANCILLON, FREDERICK: 1767, Apr. 30—1837, Apr. 19; b. Berlin; son of Louis Frederick: rose to be a minister of state in Prussia. In 1792, he was appointed Prof. of History in the Military Acad. of Berlin, afterwards Royal Historiographer, a post to which he had recommended himself by his work *Tableau des Révolutions du Système Politique de l'Europe depuis le 15<sup>me</sup> Siècle* (4 vols. Berlin, 1803-05). In 1814, he took an administrative post under Hardenberg, and, in 1818, held a very prominent position under Count von Bernstorff. In 1830, when the July revolution occurred in France, he assisted the measures of King Frederick William III. for the preservation of peace in Europe. While, like the politicians of Austria, he argued that 'all should be done *for* the people, but nothing *by* the people;' he also contended for the necessity of progressive reforms in legislation, in order to prevent all violent collisions between government and popular opinion. His private life was simple and unostentatious. Though thrice married, he left no children.

ANCILLON, LOUIS FREDERICK, grandson of Charles: b. Berlin, 1740; d. Berlin, as pastor of the French congregation, 1814.

ANCIPITAL, a. *ān-sīp'ī-tāl* [L. *ancipitem*, doubtful—



## ANCONA—ANCRE.

from *am*, on both sides; *caput*, the head]: doubtful; double-formed; double-faced; in *bot.*, two-edged.

ANCONA, *ân-kō'ná*: cap. of the prov. of A., Italy; lat. 43° 38' n., and long. 13° 35' e.; on a promontory of the Adriatic coast; rising in the form of an amphitheatre, presents a picturesque appearance from the sea. It is the seat of a bishop. The harbor, once famous, seems likely to be filled up with mud. The commerce is much less than formerly, though, in that respect, it is still one of the most important places on the Adriatic. Corn, and woolen and silk goods, oils, cordage, bacon, fruits, etc., are the chief exports. In recent years there has been a decline in the value of exports and imports. A mole, 2,000 ft. long, built by the emperor Trajan, and a triumphal arch of the same emperor, are the most notable monuments of antiquity. One of the most venerable buildings is the cathedral of St. Cyriac, built in the 10th c., and possessing the oldest *cupola* in Italy. The houses are in general mean, and the streets narrow. A. is supposed to have been founded by Syracusans, who had fled from the tyranny of Dionysius the Elder. It was destroyed by the Goths, rebuilt by Narses, and again destroyed by the Saracens in the 10th c. It afterwards became a republic; but in 1532, Pope Clement VII. annexed it to the states of the church. In 1798, it was taken by the French; but in 1799, General Meunier surrendered it to the Russians and Austrians, after a long and gallant defense. Since 1815, the citadel has been the only fortification. When the Austrian troops in 1831 occupied the Roman frontiers, whose inhabitants were then in a state of insurrection, the French ministry determined to neutralize the influence of Austria. A French squadron appeared before the harbor, and landed 1,500 men, who took possession of the town, 1832, Feb. 22, without any resistance, the citadel capitulating on the 25th. It remained in their hands till 1838, when both French and Austrians retired from the papal states. In 1849, a revolutionary garrison in A. capitulated after enduring a siege by the Austrians of 25 days. Pop. (1901) 56,835; prov. 302,172.

ANCORE, *ôn'kr*, CONCINO CONCINI, Baron DE LUSSIGNY, Marshal d', d. 1617, Apr. 24: a Florentine by birth, who came to the French court in the year 1600, with Maria de Medici, the wife of Henry IV., and with his wife Eleonora Galigai exercised an unhappy influence in promoting the disagreement between the king and queen. When, after Henry's death, the queen became regent, Concini, as her favorite, obtained possession of the reins of government; and in 1613, was made a marshal and prime minister. He purchased the marquisate of Ancres in Picardy, and took his title from it. He became an object of detestation equally to the nobility and the people. A conspiracy was formed against him, to which the young king Louis XIII. was himself privy—Luynes (q. v.), the king's worthless favorite, being one of the conspirators—and he was assassinated in the Louvre in open day. His body was privately buried, but was soon disinterred by the populace, dragged through



## ANCUS MARCIUS—ANDALUSIA.

Paris, and burned before the statue of Henry IV. His wife was soon afterwards accused of witchcraft, which she sarcastically repudiated, saying that the only sorcery she had employed to influence the queen was 'the power of a strong mind over a weak one.' The sneer, however, did not save her. She was put to death, and her son, deprived of rank and property, was driven from the country.

**ANCUS MARCIUS**, *ăn-kŭs măr'she-us*, King of Rome (the fourth, reigning 24 years): d. B.C. 614: son of Pompilia, daughter of King Numa Pompilius. Following the example of his grandsire, Numa, he endeavored to restore the almost forgotten worship of the gods and the cultivation of the arts of peace among the Romans. But, despite his inclination for peace, he was engaged in several wars with the neighboring Latin tribes, whom he subdued and reduced to order. These Latins, Niebuhr considers to have formed the original *plebs*. Against the Etruscans, he fortified the Janiculum, connected it with Rome by a wooden bridge, and gained possession of both banks of the Tiber, as far as its mouth, where he founded Ostia as the port of Rome; he dug what was called 'the Ditch of the Quirites'—a defense for the open space between the Cælian Hill and Mount Palatine; and built the first recorded Roman prison, a proof that civilization had really commenced, inasmuch as offenses then formally ceased to be regarded as private and personal matters, and were treated as crimes against the community.

**ANCYLOCERAS**, n. *ăn'sŭ-lŏs'èr-ăs* [Gr. *ankŭlos*, crooked or curved; *keras*, a horn]: a genus of fossil chambered shells curved like a horn.

**ANCYRA**: see **ANGORA**.

**AND**, conj. *ănd* [Icel. *enn*: old Sw. *æn*: Dan. *end*]: a joining word.

**ANDA**, *ăn'dă*: genus of plants of the natural order *Euphorbiaceæ*, the only known species of which, *A. Brasiliensis*, is a Brazilian tree, with large yellow flowers, and an angular fruit about the size of an orange, containing two roundish seeds, like small chestnuts. The seeds are called in Brazil *Purga dos Paulistas*, are much used medicinally in that country, and are more purgative than those of the castor-oil plant. This quality seems to depend upon a valuable fixed oil, of which twenty drops are a moderate dose. It is obtained by pressure. The bark of the tree, roasted in the fire, is accounted in Brazil a certain remedy for diarrhea, brought on by cold. The fresh bark, thrown into ponds, is said to stupefy fish.

**ANDALUSIA**, *an-dă-lŏ'she-a*, or **ANDALUCIA**, *ăn-dă-lŏ-thē'ă*: a large and fertile province or kingdom in the s. of Spain, between 36° 2' and 38° 39' n. lat., and 1° 38' and 7° 20' w. long. Having been overrun by the Vandals, it is supposed by some that they gave it the name of Vandalucia or Andalucia; but the real origin of the name is probably *Andalosh*, the Land of the West. It is the *Tarshish* of the Bible, and was called Tartessus in ancient geography. The Romans named it Bætica, from the river Bætis (the modern

Guadalquivir). The Moors founded here a splendid monarchy, which quickly attained a high civilization. Learning, art, and chivalry flourished in harmony with industry and commerce. The four great Moorish capitals were Seville, Cordova, Jaën, and Granada. During the darkness of the middle ages, Cordova was 'the Athens of the West, the seat of arts and sciences;' and later still, under the Spaniards, when 'the sun of Raphael set in Italy, painting here arose in a new form in the Velasquez, Murillo, and Cano school of Seville, the finest in the peninsula.' On the n., A. is divided from Estremadura and New Castile by the mountain chains of Aroche, Cordova, and Morena. On the e. it is bounded by Murcia, and on the w. by Portugal and the Atlantic. The s. coast eastward from Gibraltar is mountainous; the w., where the Guadalquivir flows into the Atlantic, is level. A. was esteemed the richest district of Hesperia, and its former wealth of produce has been indicated by such names as the 'garden,' the 'granary,' the 'wine-cellar,' and the 'gold-purse' of Spain. But, in the present day, such predicates are merited only by comparatively small portions of the hilly country on both sides of the Guadalquivir, where, even with careless cultivation, the soil is luxuriantly productive. Here wheat and maize ripen in April, and yield abundantly. Olives and oranges attain their greatest height, and vegetation generally assumes a tropical character. Cotton, sugar-cane, Indian figs, and batatas flourish in the open air, and the cactus and aloe form impenetrable hedges. Wine and oil abound. The botany and mineralogy of A. are very rich. The ranges of the Sierra Nevada are composed principally of primary and secondary formations. In the w., towards Xenil, cultivation is more sparing, as there is a natural deficiency of water, and the artificial means of irrigation formerly employed have fallen into disuse. Nearer the coast lie tracts of land still more barren; and the level strip extending between the mouths of the Guadalquivir and the Tinto is covered with moving sands. On the whole, A. is still one of the most fertile districts of Spain, owing to its delicious southern climate and the abundance of water supplied by its snowy mountains. Its breed of horses has long been celebrated, and the mules are superior to those of other countries. The Sierra Morena Mountains supply the wild cattle exhibited in the bull-fights of Madrid. The natural riches of the district have at various times invited colonists and invaders, such as the Phœnicians and the Moors. The Andalusians are regarded as among the most lively, imaginative, and active people of Spain. But they are also considered by the rest of their countrymen to be the Gascons—the braggarts and boasters of Spain. Apparently they have never at any time been warlike, since even Livy calls them *imbelles*. They are, like all braggarts, extremely credulous, and are remarkable for their intense superstition. The worship of the Virgin prevails to such an extent that the country is called 'the Land of the Most Holy Virgin.' They speak a dialect of Spanish mixed with Arabic. A. is divided into the prov. of Almeria, Jaën, Malaga, Cadiz, Huelva, Seville, Cordova,



## ANDALUSITE—ANDERAB.

and Granada. The chief towns are Seville, Cordova, Jaën, Cadiz (q.v.). Area, 33,340 sq. m. Pop. (1900) 3,562,516.

**ANDALUSITE**, n. *ăn'dă-lô'sīt* [*Andalu'siđ*, in Sp.]: a mineral, whitish, red, gray, or olive; an aluminium silicate, orthorhombic, and occurring in schists and slates. Macle or Chiasolite (q.v.) is a variety.

**ANDAMANS**, *ăn-dă-mănz'*: group of thickly-wooded islands towards the e. side of the Bay of Bengal, between 10° and 14° n. lat., and about 93° e. long. The population is both barbarous and scanty, and bears no resemblance whatever either in physical features or language to the neighboring Asiatic races. In 1793, the Great Andaman received a British colony, which was withdrawn in 1796. Since 1857, the A. have been a penal settlement for sepoy mutineers and other criminals. In 1872, Lord Mayo, governor-general of India, was assassinated here by one of the convicts. It is physically, however, that the A. deserve mention, not for anything in themselves, but from their being a portion of the long arch, mostly volcanic, of the Indian Archipelago, which, with Timor at its bend, comprises the Moluccas, Celebes, the Philippines, and Formosa, on the one side; and on the other side the Sunda Isles, Java, Sumatra, the Nicobars, and the A.—the outline only requiring to be filled up in imagination, in order to produce a peninsula harmonizing more or less with the other southern projections of the world, Hindostan, Africa, and S. Amer. Pop. (1901) 24,499.

**ANDANTE**, a. *ăn-dăn'tā* [It.]: in Music, implies a movement somewhat slow and sedate, but in a gentle and soothing style. This term is often modified, both as to time and style, by the addition of other words—as *A. affettuoso*, slow, but pathetically; *A. cantabile*, slow, but in a singing style; *A. con moto*, slow, but with emotion; *A. grazioso*, slow, but gracefully; *A. maestoso*, slow, with majesty; *A. non troppo*, slow, but not too much so; *A. pastorale*, slow, and with pastoral simplicity. **AN'DANTI'NO**, a. *-tē'nō* [It.]: a quicker movement than *andante*, between it and *allegretto*.

**ANDEAN**, a. *ăn-dē'ăn*, of or pertaining to the ANDES, *ăn'dēz*, a great chain of mountains running through S. Amer. **ANDESITE**, n. *ăn'dě sīt*, an igneous rock found in the Andes containing the felspar called **ANDESINE**, *ăn'dě-sīn*, of a white, gray, greenish, or yellowish color.

**ANDENNE**, *ăn-děnn'*: town of Belgium, prov. of Namur, 10 m. e. from Namur, and nearly 2 m. s. from the Maas. It has manufactures of paper, porcelain, and tobacco-pipes, for the last of which it is famous. Cotton-spinning, bleaching, and other branches of industry are also prosecuted. There are beds of pipe-clay, quarries of marble, and lead, iron, and coal mines in the neighborhood. Pop. (1901) 10,516.

**ANDERAB**, *ăn'dēr-âb'*, or **INDERAB**: town in the Afghan portion of Turkestan, on the n. slope of the Hindu Kush Mountains, and on the right or n. bank of the A. or Inderab river, a branch of the Ghorî or Kunduz, itself a branch of the Jihun; 80 m. s.s.e. from Kunduz. It is surrounded by



## ANDERNACH—ANDERSEN.

gardens, orchards, and vineyards. It is a principal entrepôt of commerce between Persia and India. Pop. supposed about 6,500.

ANDERNACH, *ân'dêr-nâk'*: little town belonging to the dist. of Coblenz on the Rhine, lat. 50° 27' n., long. 7° 25' e., once a Roman fortress styled Antunnacum, then a residence of the Merovingian kings, afterwards one of the most flourishing places on the Rhine. The great tower on the n. side, the fine old church—with one tower built in the Carolingian times—and the old gates and walls, give quite a mediæval aspect to the town. It has a trade in leather, wine, and corn, and is especially celebrated for its millstones, exported to distant parts of the world, and for its *tuffstein* or trass, an indurated volcanic mud, which, when pulverized and mixed with lime, makes a mortar or cement for constructions under water. Pop. abt. 5,700.

ANDERSEN, *ân'dêr-sên*, HANS CHRISTIAN: 1805, Apr. 2—1875, Aug. 4; b. Odense, Funen: one of the most gifted poets that Denmark has recently produced. His father was a poor shoemaker, who used to console himself by speaking of the former prosperity and wealth of his family. After his father's death he was for a short time employed in a manufactory. The widow of Bunkeflod, a poet of some reputation, charitably adopted him. He early displayed a talent for poetry, and was known in his native place as 'the comedy-writer.' Hoping to obtain an engagement in the theatre, he went to Copenhagen, but was rejected because he was too lean. He was next encouraged to hope for success as a singer; but had hardly commenced his musical studies when his voice failed. He found generous friends, however, to help him in his distress; and application having been made by one of them to the king, he was placed at an advanced school at the public expense, and so began his academic education in 1828. Some of his poems, particularly one entitled *The Dying Child*, had already been favorably received, and he now became better known by the publication of his *Walk to Amak*, a literary satire in the form of a humorous narrative. In 1830, he published the first collected vol. of his *Poems*, and in 1831 a second, under the title of *Fantasies and Sketches*. His *Travelling Sketches* were the fruit of a tour in the n. of Germany. He completed his *Agnes and the Merman* in Switzerland; and one of his best works, *The Improvisatore*, a series of scenes depicted in a glowing style, and full of poetic interest, was the fruit of a visit to Italy. Soon afterwards he produced *O. T.* (1835), a novel containing vivid pictures of northern scenery and manners, which was followed (1837) by another, entitled *Only a Fiddler*. In 1840, he produced a romantic drama, *The Mulatto*, which was well received; but another, *Raphaella*, was less successful. In the same year appeared his *Picture book without Pictures*, a series of the finest imaginative sketches. In the end of 1840, he commenced a lengthened tour in Italy and the East, of which he gave an account in *A Poet's Bazaar* (1842). In 1844, A. visited the court of Denmark by special invitation, and in the follow-

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ing year he received an annuity. After that date he travelled in various countries. Among his works are *Tales from Jutland* (1859); *The Sandhills of Jutland* (1860), *Tales for Children* (1861); *The Wild Swans* and *The Ice Maiden* (1863); *The Story of My Life* (the best picture of A.'s character); *Ahasuerus*, a drama; and *New Tales and Adventures* (1872). His complete works, pub. in Denmark in 23 vols., have been translated into German (50 vols.), English, etc. His best prose works have been pub. in this country (10 vols.). His *Dying Child* has been translated into the language of Greenland; and on his 70th birthday he was presented with a book containing one of his tales in 15 languages, and the king of Denmark gave him the Grand Cross of the Dannebrog Order. He is best known in the United States by his beautiful fairy tales. His stories for children show his delicious humor and his childlike heart.

ANDERSON, *ăn' dēr-son*: city, county seat of Madison co., Ind.; 36 m. n.e. of Indianapolis, on the w fork of White river; and on the line of the Cleveland Columbus Cincinnati and Indianapolis railroad. It was incorporated as a city 1856. It contains flour-mills, foundries, saw-mills, tannery, planing-mill, and manufactories of carriages, pumps, portable engines, etc. Four railroads enter it at different points. Pop. (1900) 20,178.

ANDERSON, ALEXANDER: earliest American wood engraver. 1775, Apr. 21—1870, Jan. 17; b. New York. He discovered a taste for art, and talent for delineation while a boy, as at the age of 12 years he began to engrave on copper cents smoothed off, and on other metals. He was self-taught, principally by watching other workmen in metals. He studied Medicine at Columbia College, graduating 1796, but abandoned his practice for his chosen art. He engraved the illustrations for Webster's *Elementary Spelling-book*, Bewick's *Birds*, and Bell's *Anatomy*.

ANDERSON, ELIZABETH (GARRETT), M.D.: English physician: b. London, 1837. She studied medicine at Middlesex Hospital, St. Andrews, Edinburgh, and the London Hospital, received a diploma 1865; was appointed general med. attendant to St. Mary's Dispensary 1866; received the degree M.D. from the Univ. of Paris 1870, and the same year became a visiting physician to the East London Hospital for children and Dispensary for women. She was elected to the London school board 1870. In 1871, Feb she was married to I. G. S. Anderson. Dr. A. has a large practice in London among women and children, and was dean of the Medical School for Women 1876-98.

ANDERSON, *ăn' dēr-son*, GALUSHA, S.T.D., LL.D.: educator: b. Bergen, N. Y., 1832, Mar. 7. The son of a farmer, he attended the district schools and worked on a farm until the age of 17, when he prepared for college, graduating at Rochester Univ. 1854, and at the Bapt. Theol. Seminary in that city 1856. He became pastor of a Bapt. church in Janesville, Wis., and in 1858 in St. Louis, whence he was called 1866 to the chair of homiletics and pastoral duties in the Newton (Mass.) Theol. Institution. He preached in



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Brooklyn and in Chicago 1873-78; was pres. of the old Chicago Univ. 1878-85; pres. Denison Univ. (Ohio) 1887-90; prof. Bap. Union Theol. Sem. 1890-2; and then became prof. of practical theology, Divinity School, Univ. of Chicago. During the war for the Union, he was very active in working in the hospitals.

ANDERSON, *ăn'dér-son*, JAMES, LL.D.: 1739-1808, Oct. 15; b. Hermiston, near Edinburgh: writer on political economy and agriculture. In his youth he invented the small two-horse plow without wheels, commonly called the Scotch plow. When 24 years of age he rented a large moorland farm of 1,300 acres in Aberdeenshire. In 1780 the Univ. of Aberdeen gave him the degree LL.D. Besides agricultural and other essays in periodicals, he published, 1791-94, a periodical, *The Bee*. In 1797, he went to London. In A.'s essay, *A Comparative View of the Effects of Rent and of Tithe in Influencing the Price of Corn* (contained in *The Recreations of Agriculture*), he anticipated the theory of rent which has since become famous by the advocacy of Malthus and Ricardo.

ANDERSON, JOHN, F.R.S.: 1726-1796, Jan. 13; b. parish of Roseneath, Dumbartonshire, Scotland: prof. of nat. philos. in the Univ. of Glasgow, and founder of Anderson's College (q.v.). He studied at the Univ. of Glasgow, in which, in his 30th year, he was appointed prof. of oriental languages, and 1760 he was transferred to the chair of nat. philos. He instituted, in addition to his univ. class, one for artisans, which he taught till the end of his life. In 1786, appeared his *Institutes of Physics*, which went through five editions in ten years. He invented a species of gun, whose recoil was stopped by the condensation of air; the model of this gun he, as a friend of liberty, presented to the National Convention, Paris 1791. By his will he devoted all his possessions to establish an educational institution in Glasgow for the unacademical population.

ANDERSON, LARZ: capitalist: 1803, Apr. 9-1878, Feb. 27, b. near Louisville, Ky.; bro. of Brig.Gen. Robert A. He was a graduate of Harvard; and became son-in-law of Nicholas Longworth, of Cincinnati, where he lived after his marriage. He was noted for his generosity and public spirit.

ANDERSON, MARTIN BREWER, LL.D.: 1815, Feb. 12-1890, Feb. 26; b. Brunswick, Me.: educator. He graduated at Waterville College 1840, studied for a year in the Newton (Mass.) Theol. Institution (Bapt.); 1842 was made tutor of Latin, Greek, and mathematics at Waterville, and later prof. of rhetoric. Here also he taught in modern history. In 1850 he became proprietor and editor of the *New York Recorder*, a weekly Bap. journal; and 1853 became pres. of the new Rochester Univ., teaching in the departments of psychology and political economy. He resigned 1888. In 1868 he declined a call to be pres. of Brown Univ. In 1862-3 he travelled in Europe, and during the civil war devoted his ability as a public speaker to the cause of the



## ANDERSON.

Union. He was for many years a member of the N. Y. state board of charities.

ANDERSON, MARY: see NAVARRO, MARY (ANDERSON).

ANDERSON, RASMUS BJÖRN: author: b. Albion, Wis., 1846, Jan. 12. His father, a Quaker, left Norway at the head of a large company of emigrants 1836, and settled in Wis. 1841. The son was educated in common schools and a Norwegian college in Decorah, Io. In 1869 he was elected instructor, and 1875 prof. of languages in the Univ. of Wis. He accompanied Ole Bull to Norway 1872 to further his acquaintance with the literature and scholars of n. Europe. In 1865 he began to write for the press, and has since been a frequent contributor to American and Norwegian periodicals. He has contributed also to *Johnson's Universal Cyclopædia*, *McClintock and Strong's Cyclopædia*, and other works. He was U. S. minister-resident to Denmark 1885-89. He is author of the following works: *Julegrave* (1872); *America not Discovered by Columbus* (1874); *Norse Mythology* (1875); *Viking Tales of the North* (1877); a transl. of Dr. F. W. Horn's *History of the Literature of the Scandinavian North* (1884); *The Elder Edda; A Guide into Teutondom*; and *Folklore Stories from the North* (1887).

ANDERSON, RICHARD HERON: soldier: 1821, Oct. 7—1879, June 26; b. near Stateburg, S. C. He graduated at West Point 1842; for some years did frontier duty; took part in the war with Mexico; was on duty in Kansas during the border troubles 1856-7; served at Fort Kearney, Neb., and resigned to accept a brigadier's commission in the Confederate army commanding the 4th corps under Lee. Ultimately he reached the rank of lieut. general.

ANDERSON, ROBERT: soldier: 1805, June 14—1871, Oct. 27; b. at 'Soldier's Retreat,' near Louisville, Ky: son of an officer in the revolutionary army. He graduated at West Point 1825; served in the Black Hawk war, and later in the Seminole and Mexican wars; was instructor of artillery at West Point; and with rank of major assumed command of Fort Moultrie, Charleston (S. C.) harbor, 1860. After S. C. had passed the ordinance of secession, A. transferred his command of 83 men to Fort Sumter, first spiking the guns at Moultrie and burning their carriages (see SUMTER, FORT). For nearly four months he was kept in Sumter by the Southern forces. At length, 1861, Apr. 13, after a protracted and destructive bombardment which dismounted the guns of Sumter and fired its gates, the fort was surrendered to the enemy, and Maj. A. with his few and exhausted men marched out with the honors of war. For his constancy to his flag he received, through the sec. of war, the thanks of the nation. The following May he was appointed brig. gen., and assigned to the dept. of the Cumberland. Gen. A. retired from active service by reason of failing health, 1863. He translated several milit. textbooks from the French, adapting them to the U. S. service.

## ANDERSON'S COLLEGE—ANDERSSEN.

ANDERSON'S COLLEGE, or the ANDERSONIAN UNIVERSITY: founded by John Anderson (q.v.); in Glasgow: intended to consist of four colleges, under the immediate superintendence of 81 trustees. It was opened with a single course of lectures on nat. philos. and chem 1796, attended by nearly a thousand men and women. In 1798 a prof. of math. and geog. was appointed. In 1799 Dr. Birkbeck began a familiar exposition of mechanics and general science—the origin of mechanics' institutes. Additional endowments have been given since 1861 by various persons; and the institution has gradually enlarged its sphere of instruction. Its staff of professors and teachers is about 20. Courses are given in physical and medical science and in chemistry; also there are taught mathematics, Latin, Greek, Hebrew, French, music, etc. As a school of medicine it has high reputation.

ANDERSONVILLE, -vil: village in Sumter co., Ga., site of a notorious Confederate military prison during the civil war. This prison consisted of a stockade 1,540 ft long and 750 wide. Beyond this was a lesser stockade, where cannon were placed and sentries constantly walked the line of the inner stockade was known as the dead line; and if a prisoner ventured into the space beyond it he was summarily shot. The prison was in charge of Capt. Wirz, who became a proverb of inhumanity throughout the nation; and who was finally tried and executed for his barbarities. The sufferings of Union soldiers at his hands were frightful. The location of the prison was execrable; the temperature was constantly changing; the rations were insufficient and nauseating; the prison was rank with stenches and was a nest of vermin; there was constant exposure to inclement weather; so that many soldiers died and many others lost their reason. In 13 months there were confined 44,882, of whom nearly 13,000 died. Even the inspector-gen of the Confederate army said of it in his report to the authorities: 'It is a place the horrors of which it is difficult to describe; it is a disgrace to civilization.' It is not to be supposed that the general sentiment of the South was in accord with these barbarities.

ANDERSSEN, *ân'dèr-sèn*, ADOLPH: German chess-player and author: 1818–79. He was engaged in teaching mathematics in Berlin. He defeated Staunton at the London tournament 1851; and was vanquished by Paul Morphy, Paris 1858. In 1862 he took the highest prize in London.



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ANDES, *ăn'dēz*: the great mountain-chain of S Amer., extending in a direction nearly parallel with the Pacific, along almost the whole length of the continent. The chain falls short of the Isthmus of Darien, between which and the Atrato—a river falling into the Caribbean Sea—it gradually subsides into a merely undulating country. It appears, also, to fall still further short of the Strait of Magellan, so far as the mainland is concerned. But, on geological grounds, it has been traced, first along the islands that breast Patagonia to the w., and next along those that form the Fuegian archipelago. Thus may the chain be said to stretch from the neighborhood of the mouth of the Atrato, not merely to Cape Horn, but even to the rocks of Diego Ramirez, which lie about 60 m. to the s.w. of that promontory. The extreme length, therefore, is from lat.  $8^{\circ} 15'$  n. to lat.  $56^{\circ} 30'$  s.—comprising, of course,  $64^{\circ} 45'$ , or, without any allowance for windings or deviations, about 4,500 English miles. But to mark the scale on which nature has molded the new world, the A. may be regarded as merely a part of the sufficiently continuous chain of about 9,000 m. which loses itself near the mouth of the Mackenzie, towards the shores of the Arctic Ocean. In this respect, the old continent can bring nothing into comparison.

*Position.*—The A., besides being generally in a direction nearly parallel with the Pacific, verge closely on that ocean. From the rocks, indeed, of Diego Ramirez to about lat.  $40^{\circ}$  s., the mountains, whether they are found on islands or on the mainland, are almost literally washed by the surf while n. from that parallel, there spreads out, between the chain itself and the sea, a belt of land not exceeding, in average breadth, 70 or 80 miles. In Peru, the belt is narrowest. The position of the A. with respect to the Atlantic Ocean presents a striking contrast. To illustrate this, a passage is subjoined from Herndon, the explorer of the Amazon on behalf of the United States. Crossing from Lima to the head-waters of the Amazon, by the Pass of Antarangra, he writes thus: 'Yanacoto, on the w. slope of the A. at the height of 2,337 ft. above the sea-level, is only 28 m. from the ocean that washes the base of the slope on which it is situated; while Fort San Ramon, at nearly the same elevation on the opposite side, cannot be much less than 4,000 m. from its ocean by the windings of the river, and in the river's direct course is at least 2,500 miles.' Further, to compare the two areas respectively to the w. and e. of the dividing ridge, the former has been estimated at 180,000 sq. m., and the latter at twenty times as much.

*Hydrography.*—See AMAZON: AMERICA. It remains here only to note that from one end of the continent to the other, the true and only water-shed, wherever there are two ranges, is the range nearer to the Pacific. Not only is the water-shed in question obviously far closer to the w. than to the e., but, beyond this, it is, apparently without a single exception, pushed as far to the w. as possible; it thus affords the most conspicuous and decisive example of an almost universal law in the hydrography of the earth. Throughout both continents, almost every leading water-shed presents a



longer descent toward the e. than toward the w., or, in other words, sends off larger streams in the former direction than in the latter. To cite a few instances: compare, in N. Amer., the Missouri with the Columbia; in Europe, the Volga with the Neva; in Asia, the Hoang ho of China with the Oxus of the Sea of Aral, and even in Africa, where, as also in Arabia, hydrographical traces have been largely overlaid by deserts of sand, the plateau of the Sahara and the chain of the Atlas gradually incline, both of them, towards the east. But, if the water-shed be invariably found as far as possible to the w., it necessarily follows, that, wherever there are two ranges, the more easterly range cannot also be a continuous water-shed—unless, indeed, it may be regarded as such with respect to the landlocked basin of the connected lakes, Titicaca and Uroz (see under AMERICA). With this exception, all the gathered waters between the two ranges, whether the intermediate space be plateau or sierra, have found or formed channels of escape—narrow, deep, and dark as they often are—only to that sea which is thirty or forty times more distant than the one at their back.

*Breadth and Area.*—The area, or the average breadth of the chain of the A., on an estimate, necessarily rough and vague, has been computed to be triple that of the belt of comparatively level land that borders on the Pacific. In a rough way, the breadth may be estimated from the very shore of the Pacific, whence the w. slope commences, to the lowest *pongos*, or cataracts, on the eastward streams. But it is more correct to measure it from the foot of the mountains, properly so called, on the one side to that on the other. The phraseology of the country, which, on such a subject, ought to be conclusive, appears to support the latter mode of computation. In Lima and its neighborhood, where Hern- don crossed the A., that officer speaks of ‘coast’ and ‘sierra,’ as distinguished from each other even to the w. of the dividing ridge. The entire distance of the Pass of Antarangra, as measured on the actual road, was 87 m.; the first 50 being *coast*, and the remaining 37 being *sierra*. Nor does the distinction seem to have been an arbitrary one. From Callao to Cócachera—a line of 44 m.—the rise above the sea level, tolerably uniform the whole way, amounted to 4,452 ft., or rather more than 101 ft. to the mile; but the next 15 m., of which about a half still belonged to what was called *coast*, yielded an increase of 2,850 ft., an average probably of 200 ft. for that part of the stage that fell under the definition of *sierra*. To give instances of extreme breadths of the A.—an average breadth being unattainable—the least breadth, and that in Patagonia, is believed to be 60 or 70 m.; the greatest breadth nearly on the parallel of Lake Titicaca, and right through the grand plateau of Bolivia, is said to be 400 m.; and to give an intermediate case, the breadth from Mendoza, in the basin of La Plata, to Santiago, in Chili, is given at 140 m.; the former city being 4,486 ft. above the Atlantic, and the latter 2,614 above the Pacific.

In order, then, to have a definite idea of the breadth of the

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A, the chain must be viewed from one end to the other, and the ordinary nomenclature will be adopted, referring each division of the A. to the particular country through which it may pass.

*Patagonian Andes.*—Including the A. of the Fuegian archipelago, this part of the chain, extending from lat.  $56^{\circ}$  s. to lat.  $42^{\circ}$  s., more than 960 m., is the narrowest of all, or is, at all events, too irregular to have its breadth accurately estimated. The Patagonian shore, strictly so called, is breasted, very much like the n.w. coast between Fuca's Strait and Mount St. Elias, by a number of islands. On these, as already mentioned, the true A. are to be found, or rather, of these the true A. consist—the continent itself affording no footing to the chain till fully 300 m. n. of Cape Horn. Even after the chain has laid hold of the mainland, it cannot be said to abandon the islands; so that here, as further to the n., the chain may be regarded as made up of parallel ranges—the main difference being that the intervening valleys, which, to the n., are basins of fresh-water rivers, here present salt-water channels.

*Chilian Andes*, stretching from lat.  $42^{\circ}$  s. to lat.  $24^{\circ}$  s., nearly 1,250 miles. Through nearly the whole of this line, the A. consists of only one range, for the parallel ridges, which run along between the great water-shed and the Pacific, cannot claim to be any exception to this remark, inasmuch as their highest points do not exceed an elevation of 2,500 ft. above the level of the sea. This part of the chain, however, presents several lateral ranges, though no parallel ones of importance. These spurs are to be seen on both sides, though of very different magnitudes. To the w., they are akin to the comparatively insignificant parallel ranges just noticed, being, if A. at all, A. merely in miniature. But to the e., the spurs deserve more consideration. They are two in number, the one branching off between the 33d and 31st parallels, and the other between the 28th and 24th. The former, called the Sierra de Cordova, advances like a promontory into the plains of Rio de La Plata, or pampas, as they are more generally denominated, as far as the 65th meridian; and the latter, called the Sierra de Salta, runs nearly as far to the e., and in a direction nearly parallel.

*Peruvian Andes.*—This part of the chain, stretching from lat.  $24^{\circ}$  s. to lat.  $6^{\circ}$  s.—a length about that of the Chilian A., 1,250 m.—is perhaps the broadest of all the divisions of the A. It certainly contains the largest of the plateaus, the plateau of Bolivia. Between the 20th and 19th parallels, not far from the city of Potosi, the chain separates into two ranges, known as the East and West Cordilleras of Bolivia; and it is the reunion of these ranges, between the 15th and 14th parallels, that incloses the land-locked plateau of Titicaca, containing, as is said, 30,000 sq. m., or an area equal to that of Ireland. Immediately above this table-land, the united ranges in question constitute the mountain group of Cuzco, which, in point of superficial extent, is stated to be thrice as large as all Switzerland. About a degree further n., the chain again separates as before, reuniting also, as before, between the 11th and 10th parallels, so as to embrace



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the cities of Guantã and Guancavelica. Hardly have the two ranges reunited, when they mass themselves into the table-land of Pasco, not quite half the size of that of Titicaca. Further to the n., the chain divides, not into two, but into three ranges, which unite again, on the frontiers of Ecuador, in the group of Loxa, about lat. 5° s.

*Andes of Ecuador.*—Immediately beyond the group of Loxa, between 4° and 3° of s. lat., the chain divides into two ranges, which, by again uniting in 2° 27', form the valley of Cuença; and immediately beyond this is the group of Assuay, with its table-land. Then another plateau of no great extent, and a short stretch of the undivided chain, lead to the vast table-land of Quito, which is said to be subdivided by low hills into five smaller plateaus, two to the e., and three to the w. Towards the n., the table-land of Quito is succeeded by the group of Los Pastos, forming the extreme portion of the A. of Ecuador.

*Andes of New Granada.*—Beyond the city of Almaguer, the chain breaks off into two ranges, which never again join each other. The range on the w. side remains undivided, till it disappears near the mouth of the Atrato, a little to the e. of the Isthmus of Darien. But the range on the e., after massing itself into the group of Paramo de los Papas, breaks into two branches, which, as distinguished from the range aforesaid on the w., are styled the Central and Eastern Cordilleras of New Granada. These two contain between them the upper waters of the Magdalena, the eastern separating them from the basin of the Orinoco, and the central dividing them from that of the Cauca. Between them also they contain several considerable table-lands, the principal one being that of Santa Fé de Bogota.

*Height.*—Under this head must be treated separately the *plateaus*, the most prominent *mountains*, and the *passes*—the altitudes of the lines of perpetual snow falling more naturally under the head of Climate. Here, as in the case of *breadth*, the chain will be followed from s. to north.

### HEIGHTS OF PLATEAUS.

|                             | Feet.  |
|-----------------------------|--------|
| Table-land of Titicaca..... | 12,700 |
| Group of Cuzco.....         | 8,300  |
| Table-land of Pasco .....   | 11,000 |
| “ Assuay .....              | 15,520 |
| “ Quinto .....              | 9,543  |
| “ Bogota... ..              | 8,958  |

The average height of these six colossal masses above the sea level is thus 11,000 feet, or considerable more than two English miles.

### HEIGHT OF MOUNTAINS.

| <i>Fruegian Andes</i> — | Feet. |
|-------------------------|-------|
| Cape Horn.....          | 3,000 |
| Sarmiento .....         | 6,800 |



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| <i>Patagonian Andes—</i>     | Feet.  |
|------------------------------|--------|
| Yanteles.....                | 8,030  |
| Corcobado.....               | 7,510  |
| Minchinadom.....             | 8,000  |
| <i>Chilian Andes—</i>        |        |
| Antuco.....                  | 13,000 |
| Aconcagua.....               | 22,296 |
| Descabezado.....             | 12,102 |
| Nevado de Chorolque.....     | 16,546 |
| <i>Bolivian Andes—</i>       |        |
| Cerro de Potosi.....         | 16,040 |
| Gualtieri.....               | 22,000 |
| Nevado de Chuquibamba.....   | 21,000 |
| “ Illimani.....              | 21,150 |
| “ Sorata.....                | 21,290 |
| Analache.....                | 18,500 |
| <i>Peruvian Andes—</i>       |        |
| Arequipa.....                | 20,320 |
| <i>Andes of Ecuador—</i>     |        |
| Chimborazo.....              | 20,600 |
| Cotopaxi.....                | 19,500 |
| Antisana.....                | 19,092 |
| Pichincha.....               | 15,920 |
| Cayambe.....                 | 19,250 |
| <i>Andes of New Granada—</i> |        |
| Pic de Tolima.....           | 18,314 |

This last-named mountain is said to be the only one in New Granada that rises above the limit of perpetual snow. All the others appear to fall short of that line.

## HEIGHT OF PASSES.

| <i>Chilian Andes—</i>        | Feet.  |
|------------------------------|--------|
| La Cumbre.....               | 12,454 |
| Portillo.....                | 14,365 |
| <i>Bolivian Andes—</i>       |        |
| Potosi.....                  | 14,320 |
| Las Gualillas.....           | 14,830 |
| <i>Peruvian Andes—</i>       |        |
| Alto de Jacaibamba.....      | 15,135 |
| Lachagual.....               | 15,480 |
| Antarangra.....              | 16,199 |
| <i>Andes of Ecuador—</i>     |        |
| Assuay.....                  | 12,385 |
| <i>Andes of New Granada—</i> |        |
| Quindiu.....                 | 11,500 |

These passes will bear a comparison with the loftiest pinnacles in Europe. The last and lowest overtops the highest summit of the Pyrenees by 332 ft.; while the last but two, that of Antarangra, which Herndon traversed, soars 389 ft. above Mont Blanc, the culminating peak of the Alps.

The passes across the A. present a vast variety of surfaces and levels. They appear to skirt, as often as practicable, the mountain torrents; and, when that is impracticable,

sometimes surmount them by bridges, and sometimes avoid them by means of a path cut along the shoulder of the overhanging height.

With respect to the mountain-torrents, Herndon, after leaving Antarangra behind him, was enabled to avail himself chiefly of this resource. 'As far as the traveller,' says he, 'is concerned, there are not, on the route we have travelled, two ranges of the A.—that is, he has not to ascend and descend one range, and then ascend and descend another. From the time that he crosses at Antarangra, his progress is downward, till he reaches the plain. Really, however, there are two ranges. The streams from the first or western range have broken their way through the second, making deep gorges, at the bottom of which the road generally runs, and leaves the peaks of the second range thousands of feet above the traveller's head.'

In addition to the essential perils of such a course, Herndon encountered, on one occasion, an incidental danger, which he thus describes—the scene being a narrow path on the shoulder of an almost precipitous hill: 'Mr. Gibbon was riding ahead. Just as he was about to turn a sharp bend, the head of a bull peered round it on the descent. When the bull came in full view, he stopped; and we could see the heads of other cattle clustering over his quarters, and hear the shouts of the cattle-drivers, far behind, urging on their herd. I happened to be abreast of a slight natural excavation; and dismounting, I put my shoulder against my mule's flank, and pressed her into this friendly retreat; but I saw no escape for Gibbon. The bull, with lowered crest and savage look, came slowly on, and actually got his head between the perpendicular wall and the neck of Gibbon's mule. But his sagacious beast, pressing her haunches hard against the rock, gathered her feet close under her, and turned as on a pivot. This placed the bull on the outside; and he rushed by at the gallop, followed in single file by the rest of the herd.'

In the bridging of the mountain torrents, much rude ingenuity is displayed. Sometimes chains are suspended from side to side; and sometimes a rough flooring is laid between projecting beams from either bank, which have previously been fixed as solidly as possible. Nature also has done something in this respect to help man, having thrown two bridges of her own over a fearful chasm at Icononzo. The torrent, which they span, falls down a beautiful cataract into a murky crevice—the noisy haunt of nocturnal birds. At a height of 400 ft. above the foaming waters, the two bridges hang in mid-air, both of them, apparently, though in different ways, the work of an earthquake. The upper one is merely a fragment of the original sandstone, which must have resisted the shock that formed the rent; while the lower, probably the most singular arch in the world, consists of three detached rocks, so adjusted as to support each other.

The loftiest pinnacles of the A., when viewed from the table-lands, and, still more, when seen from the crests of passes, lose, to the eye of the beholder, much of their real

altitude. Under such circumstances, not a single mountain presents the actual dimensions of Mont Blanc, as overhanging the Vale of Chamouni. It is only from a distance—best of all, perhaps, from a good offing in the Pacific—that the A. appear in all their gigantic proportions. Standing thus on their pedestal, the most rugged and colossal in nature, they almost realize to the spectator the highest Pyrenees piled on the highest Alps; while to enhance the grandeur of the scene, the igneous action, which has heaved the chain into existence, is here and there adding to its stature a pillar of smoke and flame.

*The Geology* of the A. is as yet very little known. It is more than half a century since Humboldt travelled through these mountains, and to him we are even now chiefly indebted for our knowledge regarding them. At that time geology was in its infancy—its language had not been formed, its classification, at least as it now exists, was unknown, and its facts were mixed with absurd and now long-exploded theories; it could, in fact, scarcely be called a science. It is fortunate that as regards the materials constituting the great mass of the A. range—the igneous rocks which form its back-bone, and the metamorphic rocks which form its great bulk—our knowledge was almost as extensive and explicit 50 years ago as it is now, and therefore, in respect to them, Humboldt's observations are as good as if made but yesterday. Not so as regards the more recent sedimentary formations. The value of fossils was not then known, and the vaguest ideas prevailed as to the chronological order of the stratified rocks. Hence descriptions written at that time are almost valueless to modern science. A few scattered notes are here gleaned from the small number of intelligent travellers who have recently visited these mountains.

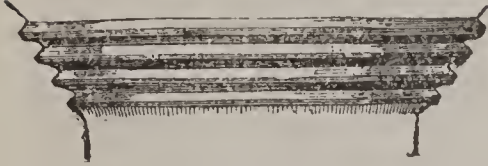
The elevation of the A. took place at an epoch anterior to the formation of the Rocky Mountains of N. Amer., which are geographically a continuation of them. They are composed, to a very large extent, of stratified metamorphic rocks. It is remarkable that granite occurs in them not as an unstratified plutonic rock, but only intercalated with the other members of the stratified azoic series. The true igneous rocks belong either to the trappean or volcanic divisions. The grand ridge is everywhere covered with one or other of the varieties of trap (greenstone, clinkstone, basalt, or porphyry). These are often broken into columns, and appear at a distance like ruined castles, producing a very striking effect.

Bursting through the trap-rocks, there are a number of *volcanoes* covering their summits with more recent igneous rocks. Among the mountains specified above as to altitude, Yanteles, Corcobado, Minchinadom, Antuco, Gualtieri, Arequipa, Cotopaxi, Antisana, and Pichincha belong to this class. Fifty-one volcanoes have been described as existing throughout the whole range. The mountains of Ecuador are so extensively and continuously of volcanic origin that they have been regarded as different safety-valves of one and the same burning vault. It is generally maintained





Angel of Queen Elizabeth.



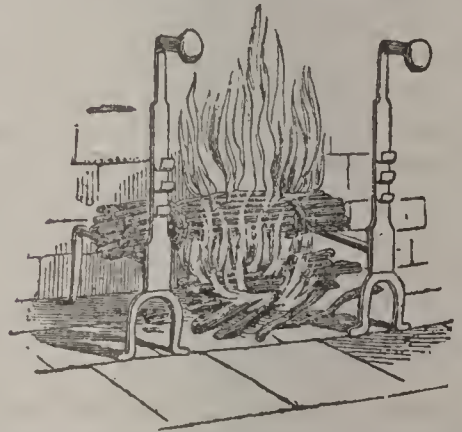
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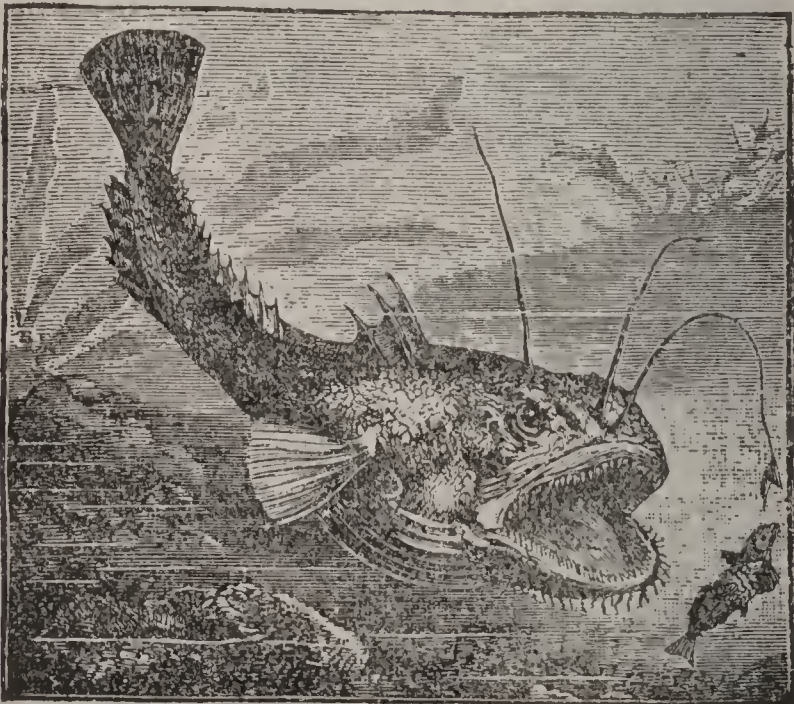
Wood Anemone (*A. nemorosa*).



Angostura-bark Tree (*Galipea cusparia*).



Andirons, from Cobham, Kent.



Angler-fish.

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that there is a relation between the height of a volcano and its activity and the frequency of its eruptions. Thus, Stromboli (2,957 ft.) has continued in a state of activity since the earliest ages, serving the purpose of a light-house to the navigators of the Tyrrhenian Sea; while Cotopaxi (19,500 ft.) and Tunguragua (16,579 ft.) have been active only once in a hundred years. Many of these 51 volcanoes have consequently not been observed by Europeans in an active state. In the Quito district there are 10 active, and 7 of doubtful activity; in Peru and Bolivia, the numbers are 9 and 3; in Chili, 17 and 5: making in all 36 active, and 15 about which there is some uncertainty as to their activity. Another characteristic of these volcanoes, resulting from their gigantic altitude, is that few of them emit streams of lava. Thus Antisana is probably the only one in the Quito range that has ejected lava. The force, however, which is repressed apparently by the immense superincumbent mass which fills the crater, is exhibited in a terrific manner when an eruption does take place. Cotopaxi, for instance, the most regular and beautiful outlet of this the grandest of nature's laboratories, has been known to shoot its fiery torrents 3,000 ft. above its snow-bound crater, while its voice is said to have been heard at a distance of 550 miles. On one occasion a piece of rock, measuring 300 cubic ft., was thrown from its crater to a distance of more than 8 miles.

*Earthquakes* are intimately connected with these volcanic phenomena. No portion of the globe is subject to such frequent and destructive earthquakes as the countries embosomed within the range of the A. and those lying between them and the Pacific. The cities and towns of Bogota, Quito, Riobamba, Callao, Copiapo, Valparaiso, and Concepcion, have all at different times been more or less devastated by their agency. During 1859, an earthquake buried many of the inhabitants of Quito under the ruins of its churches and public edifices; scarcely a single building of any size having escaped uninjured.

It is to the same subterranean agency that upheaved and still convulses the A. that we are to ascribe those fearful ravines which are almost peculiar to the chain. An apt instance has already been cited in the case of the deep and dismal crevice which has been spanned by the natural bridges of Icononzo. A still better specimen is the valley or den of Chota, which, with a width at top of only 2,600 ft., is 4,875 ft. in perpendicular height. This den might overlap the loftiest hill in Scotland, with St. Peter's at Rome on its summit.

The flanks of the mountains are clothed with crystalline stratified rocks, consisting of innumerable varieties of granites, gneiss, schists, hornblende, chloritic slates, porphyries, etc. These have been greatly disrupted by the underlying igneous rocks, and now occupy a vertical or nearly vertical position. They often run up into bold and rugged peaks on the summits. They alternate with each other in great meridional bands, but without any apparent order in the succession, except that the varieties of schist depend on the crystalline parent rock below; otherwise, no regular sequence



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can be observed; for miles, only granite and gneiss are found; then schist, quartz, gneiss, etc., interchanging. The variety and quantity of the mineral wealth of these rocks is remarkable; with the exception of lead, most of the metals are obtained in large quantities—see below. The topaz, amethyst, and other gems are abundant.

Lying unconformable with these almost vertical metamorphic rocks, there occur in the valleys and table lands, and creeping up the base of the mountains, a variety of fossiliferous beds, which require further examination before they can be clearly understood. A better estimate of the nature of these deposits will be arrived at by describing one of the localities where they occur. Take the large plateau on which Bogota is built, which is 8,958 ft. above the sea. The deposits filling up this plain have been formed subsequent to the present conformation of the district, though not necessarily at the present altitude: the whole range may have been since elevated. The almost horizontal rocks, from their organic contents, consisting of Ammonites, Hamites, etc., have been referred by Edward Forbes to the cretaceous era. The basin consists of many beds of sandstones, limestones, shale, coal, gypsum, and salt. The salt occurs in large quantities, one bed being no less than 100 ft. in thickness, and the coal in sufficient abundance to be wrought. All these rocks have been more or less affected by their proximity to the underlying metamorphic rocks. The molecular action going on below has in many places been continued in them, and has induced a cleavage at right angles to their planes of stratification. The other patches—some of great extent, as the plateau of the Titicaca—cannot yet be referred to any particular geologic epoch. Coal has been found near Huanco, in Peru, at the height of 17,000 ft.; fossiliferous limestones and sandstones have been noticed in Peru at Micuipampa and Huancavelica.

*Metals.*—The aboriginal term A. is said to have been derived from the Peruvian *anta*, which signifies metal in general, or rather, perhaps, copper in particular. Within the limits of the empire of the Incas, mining-tools, evidently not European, have been dug up in various places; and in one district the ancient Peruvians have left behind them traces of their mining operations at a height of 17,000 feet. Moreover, the term, whatever may have been its meaning, appears to have been, at all events, of Peruvian origin, for it does not seem to have been applied to the great chain of mountains by the aborigines of New Granada, now called the United States of Colombia.

The A. are understood to yield every metal used in the arts.

*Gold* is found in Chili, Peru, and Colombia. In Chili, however, it is so little productive, that proverbially a gold-mine is inferior to a silver one, and that, again, to a copper one. In Peru, gold is most abundant between the 9th and 7th parallels; though further s., to the e. of Lima, the mines of Carabaya have been recently wrought to great advantage; and further s. still, to the e. of Titicaca, very rich washings are situated on the river Tipuani. In the Colom-



bian States, gold mines are generally so inaccessible as not to bear the expense of working them. The washings, again, though perhaps remotely the product of the A., are confined chiefly to the alluvial soils that lie between the chain and either sea.

*Silver* also is found in Chili, Peru, and Colombia. In Chili, the most valuable, almost the only very valuable, mines are wrought on the e. face of the A., not far from the city of Mendoza, already mentioned in connection with the breadth of the chain. In Peru, the most productive mines are those of Pasco and Potosi. In those of Pasco, which have now been open for more than two and a quarter centuries without even approaching to exhaustion, the ore is a mixture of silver and oxide of iron. In the mines of Potosi, whose very name has become a proverb, there are said to be no fewer than 5,000 excavations, while to all appearance, only the upper crust of the inexhaustible deposits has been penetrated. In Colombia, the mines of silver, as well as of gold, are so inaccessible as not to bear the expense of working them.

*Mercury* or *quicksilver* is found in Quito, near the village of Azogué, which lies to the n.w. of Cuença—taking its name, as is said, from this metal; and it is found likewise in Peru, not far from Guancavelica, a town n. of the group of Cuzco. The mercury exists chiefly in combination with sulphur, forming what is called cinnabar.

*Platinum* appears to exist only in Colombia; but like the gold-washings of that country, it is found rather in the alluvial soils, that have been flooded down from the chain, than in the chain itself.

*Copper* is found chiefly in Chili, but also in Peru. In the latter country, it is of little account in comparison with silver; but, in the former, it may be styled the staple metal, or even the staple production. The most valuable mines are in the n. and s. provinces; in Coquimbo and Copiapo above, and in the neighborhood of Araucania below.

*Climate*.—The climate of the A. is, at every point, affected by three different considerations—position with respect to the length of the chain, position with respect to its breadth, position with respect to its height.

In connection with the *length* of the chain, the variations of climate, though less peculiar than the variations under either of the other aspects, are not merely a counterpart of similar changes in other parts of the globe. In the new world generally temperature rises and falls more rapidly in proportion to latitude than in the old; and, again, as within the new world itself, more rapidly in the s. than in the n. In connection, therefore, with the length of the A., the variations of climate may be regarded as the greatest possible—the tropical heat of the equatorial regions passing gradually into something like polar cold, even within a latitude not greater than that of Edinburgh. This may be illustrated with reference to the limits of perpetual snow. Within the Strait of Magellan, in about the latitude of Wales, the limit in question is only about 3,500 ft., nearly the precise height of the summit of Snowdon, Wales, the highest summit in s. Britain. In lat. 33° s., about the centre of

## ANDES.

Chili, the snow-line, according to Humboldt, is estimated at 12,780 ft.; while on a nearly corresponding parallel, the Himalayas present on their northern slope a snow line of 16,620 feet. In the tropical regions of the A., the snow-line seems to range from 16,000 to 18,000 feet. This result, excepting that it does not greatly surpass the height of the snow-line as above on the Himalayas, can scarcely be compared with anything in the old world, whose tropical regions do not present any chain of the requisite altitude for the purpose. Till lately it was held that there were no glaciers in the central and northern divisions of the A. It was assumed that the alternations of heat and cold, or of thaw and frost, necessary to the production of glaciers, did not exist in the lower latitudes of the A., where, generally speaking, every stage or terrace, as noticed under the head of AMERICA, possesses an almost monotonous temperature. But Mr. Whymper has recently examined carefully many of the chief peaks, several of which he has ascended for the first time. In 1880, he announced with confidence that there are regular glaciers, some of them of enormous extent, on Chimborazo, Cotopaxi, Antisana, Sincholagua, and at least six other great peaks.

In connection, next, with the *breadth* of the chain, the variations of climate, if not peculiar to the A., have no perfect parallel elsewhere. At every point, excepting, perhaps, towards the extreme s., the chain is almost as much of a water-shed to the clouds as it is to the rivers. Rarefied as the air is at the elevation of the A., no vapor, generally speaking, can cross them—even the existence of snow at the height of several miles, being a phenomenon which, *a priori*, was hardly to be expected. This fact is rendered, more important by the ordinary directions of the currents of air. The prevailing winds blow against the A., not alongside of them, being generally from the e. between the equator and  $30^{\circ}$ , and from the w. in latitudes towards the south. Thus, generally speaking, every section of the chain has permanently a windward and a leeward side—the former intercepting nearly all the moisture, and the latter being condemned to comparative drought. Peru, Chili, and Patagonia, one and all, confirm these observations in detail. On the w., Peru, unless in the immediate vicinity of the mountain streams, is little better than a desert; while, on the e., the Montana, as it is called, is remarkable for its fertility. To the w. on the contrary, Patagonia has its glaciers to show as the result of its rains from that quarter; while, to the e., its five terraces, extending 700 m. to the Atlantic, are almost uniformly arid and sterile. Between Patagonia and Peru, Chili has something in common with both, resembling the former in its southern half, and the latter in its northern. To take the Pacific side alone; in the n. parts, showers are only occasional, sometimes at an interval of three years—the deficiency being partly supplied by frequent dews; while, to the s. of lat.  $34^{\circ}$ , the rains are sufficiently copious to form considerable rivers.

In connection, lastly, with the *height* of the chain, the variations of climate stand alone in the world, being approached, though at a great interval, only by the corre-

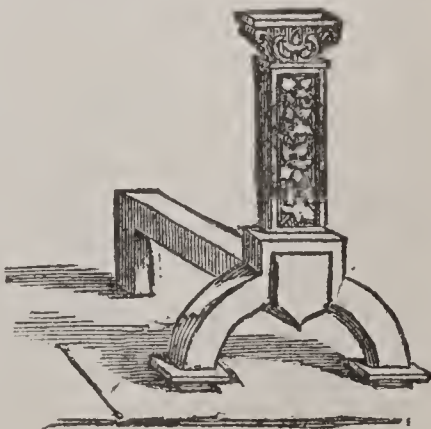


## ANDIRA—ANDIRONS.

sponding changes in Central America. The Alps, to take a familiar analogy, have, it is true, their gradations of climate. But, situated, in round numbers, on about the 45th parallel, they represent only half of the latitudes between the equator and the pole; while the A. of Quito, before reaching this level, must have seen melting into each other the temperatures of Borneo, India, Persia, Asia Minor, and Italy. Taking the snow-line of the A. of Quito at 18,000 ft., and that of the Alps at 8,000; the lower and hotter 10,000 ft. of the former have no counterpart at all on the latter. Now, Herndon found Tarma to lie within this height, precisely at an elevation of 9,738 ft.; and he there saw apples, strawberries, almonds, grapes, and maize—a state of things not far behind that at the foot of the Alps. One general observation must close this article. In an open locality, the naked eye may embrace half a zone; for, to quote a traveller's words, it may look upwards to the barley-field and the potato-patch, and downwards to the sugar-cane and the pine-apple. Perhaps the most striking instance of this more than telescopic vision is connected with the magnificent fall of Tequendama, the single outlet of the waters of the table-land of Bogota. This fall, 600 ft. high, leaps down from the temperate zone to the torrid, from rich crops of wheat to a few scattered palms.

**ANDIRA**, *ăn-dî'ră*: genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having an almost orbicular, one-celled, one-seeded pod.—*A. inermis* (formerly known as *Geoffroya inermis*) grows in low savannahs in the West Indies, and is there called *Cabbage Tree* or *Cabbage-bark Tree*. It is a tree of considerable height, having pinnate leaves, with 13–15 ovato-lanceolate leaflets, and panicles of reddish lilac flowers. Its bark, called *Cabbage Bark* or *Worm Bark*, is a powerful anthelmintic; and although it has recently been discarded from the pharmacopœias of Britain, still finds a place in those of other countries, with *Surinam Bark*, the bark of *A. retusa* (formerly *Geoffroya Surinamensis*), a native of Surinam. Similar properties reside in the bark of several species of the allied genus *Geoffroya*. Cabbage Bark contains an alkaloid called *Jamaicina*.

**ANDIRONS**, or **HANDIRONS**: n. plu. *ănd'îrns* [mid. L. *andē'na*, andirons; Flem. *wendijser*—from *wenden*, to turn]: in ancient kitchens, the iron bars which supported the logs used as fuel, or the spit—now applied to movable fire-irons; also applied to the upright movable iron plates inside the fireplace of a kitchen-grate for contracting the space at pleasure; a term frequent in inventories of the furniture of old houses; and now used in the United States for what are more generally known in Britain as fire-dogs. A. were used



Andiron.



for burning wood on an open hearth, and consisted of a horizontal bar raised on short supports, with an upright standard at one end. A pair were used, one standing at each side of the hearth, and the logs of wood rested across the horizontal bars. The upright portions of the A. were of various forms, some of them, in later times, representing a human figure. More generally, the design was architectural, much ornamented with arabesques, and frequently with the monograms of their possessors. The ornamental parts of the A. were sometimes silver, but more often copper.

ANDKHUY, *ând-kô'e*: town, formerly of Bokhara, now of Afghanistan, Central Asia; about 200 m. s. of Bokhara, on a river flowing n. towards the Jihun, but only part of which has as yet been traced. It lies on the high road to Herat, and is much exposed to the attacks of the Emirs of Bokhara and Afghanistan. Before 1840, it is said to have been tolerably flourishing. It was then subject to Bokhara, and was compelled to oppose the victorious march of Mohammed Khan, who besieged it during four months, and at last took it by storm. The city was plundered, and left a heap of ruins. The sovereign, Gazanfer Khan, to preserve himself from utter destruction, threw himself into the arms of the Afghans. A. contained in 1863 about 2,000 houses, which form the city, and about 3,000 tents, either in the environs, or scattered over the oases in the desert. Pop., estimated 15,000, consists principally of Turkomans, with a mixture of Uzbeks and a few Tadjiks.—Vámbéry's *Travels in Central Asia*.

ANDORRA, *ân-dôr'rá*: valley in Spain, in the Eastern Pyrenees, between the French dept. of Ariège and Catalonia; about 300 sq. m. Inclosed by mountains, its inaccessibility fits it to be the seat of the interesting little semi-independent state, whose capital is Andorra, on the Balira (pop. 2,000). There is some forest and much excellent pasture; and the mountains contain rich iron mines; but agriculture is neglected, and there is little arable land.—A., according to tradition, was declared a free state by Charlemagne, in reward for its services when he was marching against the Moors; he retained certain rights which Louis le Débonnaire transferred to the bp. of Urgel, 819, and which the bp. of Urgel still exercises. The govt. is by a sovereign council of 24 members, chosen by the people, and the council elects one of its members to be syndic for life, who is the chief executive. France exercises a kind of protectorate. A sum of 960 francs is paid biennially to France for the privilege of free importation of corn, and 891 francs is paid in the intervening years to the bp. of Urgel. The manner of life of the Andorrans is very simple. There are schools, but education is in a low state. The people, all Rom. Catholics, speak the Catalan Spanish. There is a complete military organization. In the Carlist wars the neutrality of A. was strictly respected, though amid various complications. French speculators have endeavored to introduce gambling at the springs of Escaldas. Pop. stated variously from 4,000—12,000.

## ANDOVER—ANDOVER THEOLOGICAL SEMINARY.

ANDOVER: township in Essex co., Mass., 23 m. n. of Boston, reaching on the n to the Merrimac river; intersected by the Boston and Maine and several other railroads. Water-power is employed in manufacturing bread, linen, and flannels. The township was incorporated 1646. The scenery is charming; and A. is the seat of famous educational institutions. The Andover Theological Seminary (q.v.) was founded 1808: this seminary is affiliated with the Phillips Academy (q.v.), preparatory collegiate school of the highest order, founded during the revolutionary war. The Abbot Female Acad. also is a flourishing institution. Pop. (1880) 5,169, (1890) 6,142; (1900) 6,813.

ANDOVER, *ān'dō-vēr*: municipal borough and market-town in n.w. Hampshire, England. Originally *Andeafaran* (passage of the river Ande), A. dates from a remote antiquity. Pop. (1891) 5,852.

ANDOVER THEOLOGICAL SEMINARY: in Andover, Mass.; opened for students 1808, 'to provide for the church a learned, orthodox, and pious ministry.' It is affiliated with Phillips Acad. (q.v.), of which it is an adjunct. The prevailing religious sentiment is Congregational, but the seminary has always been conducted so liberally that very many eminent ministers of other denominations have been among its students. It has always been characterized by a strong missionary feeling. The founders were Samuel Abbot, John Phillips, Jr., and Phœbe Phillips, of Andover; Moses Brown and William Bartlet, of Newburyport; and John Norris, of Salem. The funds, increased by donations, some of them large, amount to nearly \$1,000,000. The seminary property is estimated at \$250,000. Its affairs are administered by a governmental board of 7 professors, 13 trustees, and a librarian. There are also 3 visitors who have supervisory functions regarding the due observance of the founders' intent. A. is the oldest specifically theological Protestant school in the United States: previous to its establishment, theological instruction was given in the colleges, or by prominent pastors. It has served as a model for many similar institutions in other denominations. The roll of its professors shows names revered in all departments of theology; a few of these are Moses Stuart, Bela B. Edwards, and Austin Phelps. The distinguished name of Edwards A. Park, D.D., LL.D., still stands at the head of the faculty, but as prof. emeritus; and he is understood to be far from sympathizing with the recent 'Andover movement' and the new theology in general. In his place in the chair of Christian theology is George Harris, D.D. Egbert C. Smyth, D.D., has the dept. of eccles. hist., is pres. of the faculty, and has been most prominent in the new controversies associated with this institution. In all there are (1897) 8 active professors and four lecturers from outside. There are 2 resident licentiates or fellows, 8 students in the advanced graduate class; and 72 undergraduates, of whom 24 are seniors, 13 middle class, 29 juniors, and 6 special—the total now again increasing after the serious diminution occasioned by the theol. controversy of recent years. The lecturers are selected every year



from men distinguished in the pulpit or otherwise; and important published volumes have resulted. The *Andover Review*, a theol. magazine of the highest class, is edited by the professors. The regular studies in the junior year are Hebrew, New Test. Greek, Biblical exegesis and history, and fundamental theology; in the middle year, chiefly Biblical and systematic theology; and in the senior year, mainly sacred rhetoric, pastoral theology, and history of Christian life and doctrine. The elective courses for 1892-3 include ethics, social economics, Arabic, Aramaic, Egyptology, Assyriology, German, philosophy, etc. Rooms and tuition can be had without charge. Six scholarships are available for the 'advance class' of graduates. The library numbers more than 48,000 vols. The museum contains objects relating to missionary life and work, a relief model of Jerusalem, and a large Palestinian collection, constituting a rich series for illustration of the Bible. There is a well-furnished gymnasium. The other buildings comprise a modern chapel, and Brechin Hall (the library), of ornate stone, besides the old Bartlet chapel and Phillips and Bartlet Halls. The ample campus is shaded by venerable elms.

ANDRAL, *ǎn-drâl'*, GABRIEL, M.D.: 1797—1876, Feb. 13; b. Paris: French pathologist. In 1824, he published his *Clinique Médicale*; 1827 he was appointed prof. of hygiene, and 1830 of internal pathology, in the Univ. of Paris; and 1839, by election of his colleagues, succeeded Broussais in the highest chair. His *Précis d'Anatomie Pathologique* (1829) had great success. Other works were: *Cours de Pathologie Interne* (1836, 7); *Traité Élémentaire de Pathologie et de Thérapeutique Générale* (1840); etc.

ANDRÉ, *ǎn'drā* or *ǎn'drī*, JOHN: 1751-1780, Oct. 2; b. London, of Genevese parents: an unfortunate soldier who met his death under circumstances which have given his name a place in history. At the age of twenty, he entered the army, and soon afterwards joined the British forces in America, where, in a few years, through the favor of Sir Henry Clinton, he was promoted to the important post of adjutant-general, with the rank of major.

Sir Henry Clinton being in secret treaty with the American general Arnold, who commanded the fortress of West Point, for the betrayal to the British of the fortress with its magazines, including the whole stock of powder of the American army, confided the conduct of the correspondence on his part to Major A. The secret correspondence was conducted by Arnold and A. under assumed names, and as if it related to commercial affairs; and the treachery was so well concealed that the Americans had no suspicion of Arnold's fidelity. At last it remained only to settle the time and means of carrying the scheme into execution; and these it was determined should be settled in a personal interview between Arnold and A., either because Arnold required such an interview, or, more probably, because Clinton had some misgivings as to the identity of his correspondent. Various projects to bring about the interview having failed, A., at last, 1780. Sept. 20, proceeded in a



British sloop-of-war—the *Vulture*—up the Hudson nearly to the American lines. The original design was to have met under cover of a flag of truce, on the pretense of effecting some arrangement as to the sequestered property of a Col. Robinson, a loyalist gentleman who accompanied A., and whose house was at the time Arnold's headquarters; but this design had to be abandoned, and Arnold was obliged to contrive a secret interview. On the night of Sep. 21, he prevailed on a Mr. Smith, who lived within the American lines, to go to the *Vulture* with a packet for Col. Robinson. Smith went, and returned with A., who passed under the assumed name of Anderson. Arnold met him on the shore, where they conferred some time, after which they went within the lines to Smith's house, and there spent the rest of the night and part of the next day arranging the details of their plan for the treacherous surprisal of West Point.

Early on the morning of Sep. 22, a gun was brought to bear on the *Vulture*, and obliged her to fall down the river so far that A. could not prevail on the boatmen to take him to her, and so was forced to make his way by land to the English lines in a disguise furnished by Smith, and provided with a pass from the general. A. actually reached a point safely within sight of the English lines, when he was stopped and taken prisoner by three American militiamen, to whom, mistaking them for British, he inadvertently revealed the fact that he was a British officer. His captors, on searching him, having discovered concealed in his stockings the plans of West Point, and other papers connected with the proposed treachery, which he was bearing from Arnold to Clinton, carried him as a spy to a Col. Jamieson, who, not suspecting anything, was for sending him on to Arnold. Here a chance of escape opened for him, only for a moment. He was ultimately sent, with the papers found on his person, to Gen. Washington. Jamieson, meantime, having sent word to Arnold of the capture of A., Arnold fled to the *Vulture*, and so saved his life.

A., as a spy taken in the act, was liable, according to the rules of war, to be hanged at once. But considering the rank of the prisoner, and the circumstances, Washington resolved on referring the case to a board of general officers, to report the facts, with their opinion of the light in which the prisoner ought to be considered, and the punishment that ought to be inflicted. The board found that he ought to be considered as a spy from the enemy, and punished with death. Strenuous efforts were made by the British commander to save him. It was represented to Washington that A. could not be regarded as a spy, because—1. He entered the American lines under a flag of truce; 2. That all his movements within the lines were directed by the general. The first plea, on A.'s own authority, was contrary to the fact; and to the Americans it rightly appeared that the point of the offense lay in the communication with the base traitor Arnold. All the efforts of Clinton failed to move the American commander. A. was sentenced to death. On one condition only would Washington spare him—that the British should surrender Arnold. But this they could not think of doing; the sense of honor which, yielding to the

spirit of war, offered no opposition to a bargain with Arnold for the blood and liberties of his compatriots, made it impossible to deliver up the runaway traitor to the death that otherwise awaited the soldier who only went too far in his zeal for his country.

A. suffered death by hanging at Tappan, N. Y., in his 29th year. His death everywhere excited the deepest sympathy. The whole British army went into mourning for him, a monument was erected to his memory in Westminster Abbey, and in 1821 his remains were disinterred at Tappan, and conveyed to a grave near his monument.

A. was a handsome and amiable man, of considerable accomplishments, was a good artist, and man of literary culture.

The three captors of A. were John Paulding (1758–1818, Feb. 18; b. New York, d. Staatsburg, N. Y.), Isaac Van Wart (1760–1828, May 23; b. Greenburg, N. Y., d. Mount Pleasant, N. Y.), David Williams (1754, Oct. 21—1831, Aug. 2, b. Tarrytown, N. Y., d. near Livingstonville, N. Y.). The patriotic motive of the captors, sometimes questioned, has been vindicated in public addresses by Horatio Seymour and Henry J. Raymond (1853), Samuel Tilden and Chauncey M. Depew (1880), and Grenville Tremaine and Daniel Knower (1876).—See PAULDING, JOHN.

Much has been written on the subject of A.'s death under military law. It has often been maintained, and notably by Lord Mahon, in his *History of England* (vol. vii.), that his sentence was unjust. But a simple narrative of the circumstances, even as they are to be gathered from Lord Mahon's own pages, shows that the American general had no alternative. Indeed, the circumstances cited to show that A. was not a spy, in the ordinary sense, all go to prove that he was a spy of the worst sort. The success of the treachery of Arnold would have been the destruction of the American cause; and it is hard to see how the agent who went secretly within the American lines, and was captured returning in disguise with the information that was to insure that success, is to be held in a better case than the common soldier who steals his way into the enemy's camp of a night, to see the extent of his preparations and forces.

ANDREÆ, *ân-drä'ä*, JOHANN VALENTIN: 1586, Aug. 17—1654, June 27; b. Herrenberg, near Tübingen: a very original thinker and writer. He studied at Tübingen, travelled in the south of Europe, obtained ecclesiastical preferments in the Protestant Church of his native country, and died at Stuttgart, where he was chaplain to the court. Eminently practical in his mental disposition, he was grieved to see the principles of Christianity made the subject of mere empty disputations, and all science and philosophy in like manner perverted by a frivolous scholasticism. To the correction of this prevailing tendency of his age, the efforts of his whole life were directed. His writings are remarkable for the wit and humor, as well as for the learning, acuteness and moral power which they display. He has been long regarded as the founder, or at least the restorer, of the order of the Rosicrucians (q.v.); and this opinion is plausibly supported by reference to three publications—the *Chymische*



## ANDRÉE'S BALLOON—ANDREW.

*Hochzeit Christiani Rosenkreuz* (1616), the *Fama Fraternitatis R. C.*, i.e., *roseæ crucis* (1614), and the *Confessio Fraternitatis R. C.* (1615), of the first of which he acknowledged himself the author, and the other two have so much resemblance to it as to be evidently from the same pen. But, however these works were misunderstood by his contemporaries, and particularly by those who were inclined to mysticism in religion, his intention in them was certainly not to originate or promote secret societies of mystics and enthusiasts, but to ridicule the follies of the age. He attacked Rosicrucianism itself in some of his later writings with great severity. Among the best of his works are his *Menippus s. Satyricorum Dialogorum Centuria* (1617). His *Mythologica Christiana* (1619) is another of the best known. He wrote an allegoric poem called *Die Christenburg* (of which an edition was published, Stuttg. 1836), and an autobiography (Winterthur, 1799).

**ANDRÉE'S BALLOON POLAR EXPEDITION:** novel and daring enterprise in aëronautics. Prof. S. A. Andrée, examiner-in-chief of the Royal Patent Office of Sweden, had cherished since 1876 the plan of reaching the north pole by balloon from Spitzbergen, thence passing on to land in Siberia, Alaska, or Brit. America. After long study of aëronautics and numerous experiments, he at last secured subscriptions amounting to \$37,000, of which \$10,000 was expended for the balloon. This was made of varnished silk, 75 ft. in height, or 97 ft. to the bottom of the basket. The balloon was provided with sails and rudders, and with drag-ropes, 1,000 to 1,200 ft. in length, designed at once to aid in steering it, and by its weight to keep it at a nearly uniform distance of about 500 ft. from the earth. Prof. Andrée expected to pass the pole in about 42 hours and reach continental land in about 6 weeks. A start was made from Spitzbergen 1897, July 11. The last heard from him was two days later, when a carrier pigeon reported him in lat. 82.2°, long. 15.5° e.

**ANDREW**, *ān'drū*, the Apostle: the first disciple of Christ; like his brother Peter, a fisherman. Previous to his recognition of Christ as the Messiah, he had been numbered among the disciples of John the Baptist. (Jn. i. 40, 41). The career of A. as an apostle, after the death of Christ, is unknown. Tradition tells us that after preaching the gospel in Scythia, Northern Greece, and Epirus, he suffered martyrdom on the cross at Patræ in Achaia, 62 or 70. A cross formed of beams obliquely placed is styled St. A.'s Cross. In early times a spurious supplement to the Acts of the Apostles was circulated among certain sects under the title *Acta Andreæ*. A. is the patron saint of Scotland; and is greatly venerated in Russia, as the apostle who, according to tradition, first preached the gospel in that country. His day in the calendar is Nov. 30.

**ANDREW, JOHN ALBION**, LL.D.: statesman: 1818, May 31—1867, Oct. 30; b. Windham, Me. He graduated at Bowdoin College, studied law in Boston, and was admitted to the bar. He gained celebrity for his defense of those who were arrested under the Fugitive Slave Law of 1851.



## ANDREW—ANDREWES.

He was elected to the legislature 1858. In 1860 he was a delegate to the republican convention at Chicago which nominated Abraham Lincoln for pres. In the same year he was elected gov. of Mass, and was annually re-elected until 1866, when he declined the nomination. He was active in raising troops for the U. S. govt. during the rebellion, and within a week after the president's proclamation of 1861, Apr. 15, dispatched five regts. of artillery, a battalion of riflemen, and a battery of artillery to Washington. He drew up the address presented to the pres. by the governors of the loyal states, in convention in Altoona, Penn., 1862, Sep. In 1863, Jan., he obtained permission from the war dept. to enlist colored troops, and promptly raised the 54th Mass. regt. In 1865 he presided at the first national Unitarian convention, held in New York. In 1866 he resumed the practice of law, in which he continued until his death—which undoubtedly resulted from his excessive labors in connection with the war. He was known as 'the War Governor.'

ANDREW, ST. (or THE THISTLE), ORDER OF: Scottish order of knighthood, named after the patron saint of Scotland. see THISTLE, ORDER OF THE.

ANDREWES, *ān'drūz*, LANCELOT, D.D.: 1555-1625, Mar. 27; b. London: eminent English prelate. At Pembroke Hall, Cambridge, he distinguished himself by industry and acquirements, and was in 1576 elected a fellow. He took orders, and Walsingham advanced him 1589 to be a prebendary and canon residentiary of St. Paul's and Master of Pembroke Hall. Queen Elizabeth next testified her esteem by appointing him one of her chaplains in ordinary, and a prebendary and dean of Westminster. He rose still higher in favor with King James; attended the Hampton Court conference, as one of the ecclesiastical commissioners, and took part in the translation of the first twelve books of the Old Testament. In 1605, he was consecrated Bp. of Chichester. In 1609 he was translated to the see of Ely, and appointed one of his majesty's privy-councillors, both for England and Scotland. To the latter country he accompanied the king 1617, to persuade the Scotch of the superiority of episcopacy over presbytery. In the following year he was translated to Winchester, where he died. Bp. A. was, excepting Usher, the most learned English theologian of his time. As a preacher, he was regarded by his contemporaries as unrivalled; but his excellent qualities suffer much depreciation from his extremely artificial and frigid style. In reply to Cardinal Bellarmine, he wrote in defense of the right of princes over ecclesiastical assemblies. His other works consist of sermons, lectures, and manuals of devotion. Bishop A. was the most eminent of that Anglican school in the 17th c. of which the 19th has seen a faint revival under the name of Puseyism. Its distinctive peculiarities were high views of ecclesiastical authority, and of the efficacy of sacraments and apostolic succession; and opposition to Puritanism. In his whole character and life, A. was singularly pious, meek, and charitable—a blameless and noble soul.

## ANDREWS—ANDROGYNOUS.

**ANDREWS, ELISHA BENJAMIN, LL.D.:** American educator, b. Hinsdale, N. H., 1844, Jan. 10. He entered the Union army 1861, and rose to second lieut. In 1870 he graduated from Brown Univ., and entered Newton Theol. Seminary. After ordination, and a short pastorate of a Bapt. church, he was a prof. in Denison Univ., Granville, O., and afterward in Brown Univ., Providence, R. I., was prof. of history and polit. economy. Thence he went to the chair of polit. economy at Cornell Univ., but after one year he returned to Brown as its president. In this position Dr. A. added to the high repute of the institution and gained renown for himself by his distinguished success as an educator. In 1897, a remonstrance by a committee of the corporation concerning Dr. A.'s public expression of views favoring free coinage of silver at a ratio of 16 to 1 was interpreted by him as restricting the proper liberty of his office. Thereupon he resigned, and was appointed Superintendent of Public Schools in Chicago, which post he left in 1900 to become chancellor of the University of Nebraska.

**ANDREWS, EDWARD GAYER, D.D.:** bishop of the Meth. Episc. Church b. New Hartford, N. Y., 1825, Aug. 7. He graduated at Wesleyan Univ., Middletown, Conn., 1847; and entered the Meth. ministry 1848. In 1850 he was ordained an elder. In 1855 he became a teacher in Cazenovia (N. Y.) Seminary, and was chosen pres. the same year. He became a preacher in the New York east conference 1864, and was elected bp. 1872.

**ANDRIA, *ân'drê-â*:** city of s. Italy, prov. of Bari, 31 m. w. from the town of Bari. It stands on a plain, and in its vicinity are numerous caverns (*antra*), whence its name. Its cathedral, a fine edifice, was founded 1046. During the wars of the Parthenopean Republic (q.v.) it was besieged by the republican army under General Broussier, and being taken after a gallant resistance, was burned, at the suggestion of Ettore Carafa, Count of Ruvo, himself its feudal lord. The neighboring country is famous for its almonds, which are a principal article of trade of the city. Pop. 39,493.

**ANDRŒCIUM, n. *ăn-drê'si-ŭm*** [Gr. *anēr* or *andra*, a man; *oikos*, a house]. in *bot*, the male organs of the flowers; stamens taken collectively.

**ANDROGYNUS, n. *ăn-drōj ĭ-nŭs*** [Gr. *anēr* or *andra*, a man; *gu nē*, a woman] a single individual having the characteristics of both sexes, an hermaphrodite. **AN; DROG'YNAL, or ANDROG'YNOUS, a. -nŭs**, of both sexes—having male and female florets on the same footstalk. **ANDROGYNALLY, ad. -nāl-lĭ** **ANDROG'YNISM, n. -ĭ-nŭzm**, in *bot*, a change from a dioecious to a monœcious condition.

**ANDROGYNOUS** term sometimes employed in botany to designate an inflorescence which consists of distinct male and female flowers; and more frequently in zoology in reference to animals which possess a distinct male and female generative system in the same individual. This is the case with very many of the lower kinds of animals, but is not inconsistent with a necessity for the co-operation of



## ANDROID—ANDROMEDA.

two individuals in the propagation of the species. See HERMAPHRODITE: PHYSIOLOGY: REPRODUCTION.

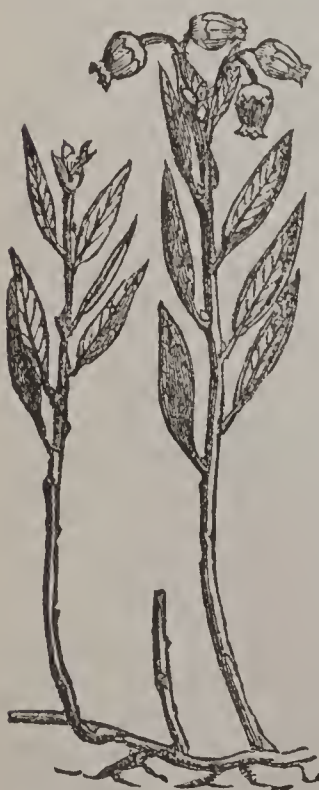
**ANDROID**, n. *ăn'droyd* [Gr. *anēr* or *andra*, a man; *eidos*, form]: an automaton in human form **ANDROIDES**, plu. *ăn-droy'dēz*, automata in human form.

**ANDROMACHE**, *ăn-drōm'ă-kē*, in Legend, wife of Hector: daughter of King Eëtion of Thebes, in Cilicia, and one of the finest female characters in Homer's *Iliad*. During her childhood, Achilles slew her father and her seven brothers. Her love of Hector is pathetically depicted in her address to the hero on his going to battle, and her lamentation over his death (*Iliad*, 6 and 24). After the fall of Troy, she was given into the hands of Pyrrhus (son of Achilles), who took her away to Epirus, but afterwards surrendered her to Helenus (Hector's brother), by whom she had a son named Cestrinus. A. is the heroine of one of the tragedies of Euripides.

**ANDROMEDA**, *ăn-drōm'ě-dă*, in Legend, daughter of the Ethiopian king Cepheus, by Cassiopeia: like her mother, remarkably beautiful. When Cassiopeia, with motherly pride, boasted that her daughter was more beautiful than the Nereids, these offended deities prayed Neptune to revenge the insult. Accordingly, the territory of King Cepheus was devastated by a flood; and a terrible sea-monster appeared, whose wrath, the oracle of Ammon declared, could only be appeased by the sacrifice of A. As A. was fastened to a rock, and left as a prey to the monster, Perseus, returning from his victorious battle with Medusa, saw the beautiful victim, and determined to rescue and win her. Having slain the sea-monster, he received A. as his reward. Minerva gave A. a place among the constellations.

**ANDROMEDA**: genus of plants of the natural order *Ericaceæ* (q.v.) distinguished by a 5 valved naked capsule, which splits up through the back of the cells; anthers with two awns, and a globose corolla with the orifice contracted. The species, which are numerous, have very much the general appearance of heaths. Most of them are small shrubs, but some attain a considerable size. The only British species is *A. polifolia*, occasionally found in peat-bogs in different parts of the country, and common throughout the n. of Europe and N. Amer., a small evergreen shrub with beautiful rose-colored drooping flowers. It has acrid narcotic properties, and sheep are said to be killed by eating it. The shoots of *A. ovalifolia*, in like manner poison goats in Nepaul; and similar effects are ascribed to *A. Mariana* the stagger bush in the United States.—*A. fastigiata* was observed by Dr. Hooker

*Andromeda polifolia*. abounding at great elevations in the Himalayas; a humble shrub, resembling the heather of Scot





## ANDRONICUS.

land. The leaves are used as a substitute for tea. See **SORREL-TREE**.

**ANDRONICUS**, *ăn-drō-nī'kŭs*, I.: Byzantine Emperor: 1112—85, Sept. 12: son of Isaac Comnenus. He was one of the most conspicuous characters of his age, which produced no man more brave, more profligate, or more perfidious. His life was full of extraordinary vicissitudes. During part of his youth, he was a prisoner of the Turks in Asia Minor, He afterwards spent some time at the court of his cousin, the emperor Manuel, and a niece of the emperor became his mistress. He was appointed to a military command in Cilicia; but although his courage, his noble appearance, and his gracious manners made him the favorite of the army, his imprudence and waste of time in dissolute pleasures involved him in defeat. Having engaged in a treasonable correspondence with the king of Hungary and the German emperor, he was thrown into prison by Manuel, and remained there above twelve years; but at last made his escape, and, although not without further extraordinary adventures, reached Kiew, the residence of the Grand Duke Jaroslav. He regained the favor of his cousin by persuading the Russian prince to join him in the invasion of Hungary, and by his gallantry in that war; but incurred his displeasure again by refusing to take the oath of allegiance to the prince of Hungary, the intended husband of Manuel's daughter, as presumptive heir to the empire. He was sent in honorable banishment to Cilicia, where he found a new mistress in a sister of the empress. The resentment of the emperor breaking out against him, he sought refuge in a pilgrimage to Jerusalem. His professions of zeal made his former conduct to be forgotten, and he was invested with the lordship of Berytus; but his profligacy became, if possible, more scandalous than ever in the seduction of Theodora, the widow of Baldwin, king of Jerusalem, who lived with him for years as his mistress. The emperor's anger made Palestine unsafe for him, and he fled with Theodora to Damascus, and finally settled among the Turks in Asia Minor, with a band of outlaws, making frequent inroads into the Roman prov. of Trebizond, from which he carried away spoil and slaves. Theodora and her children were at last taken and sent to Constantinople, and thither he followed, imploring, with a chain about his neck, and in a form of abject submission, the forgiveness of the emperor, which he obtained, but was sent to Oenoe in Pontus. After the death of Manuel, popular indignation was excited against the empress, who acted as regent for her son, Alexius II., and A. was recalled in 1182 to deliver the empire from her tyranny. He was appointed guardian of the young emperor, and, soon afterwards, his colleague in the empire. He caused the empress-mother to be strangled, and afterwards Alexius himself, with whose widow he contracted an indecent marriage. His reign, though short, was vigorous, and restored prosperity to the provinces; but tyranny and murder were its characteristics in the capital. He set no bounds to the gratification of his revenge against all who had ever offended him, and his jealousy of possible rivals was equally sanguinary. At

## ANDRONICUS—ANDUJAR.

last, a destined victim, Isaac Angelus, one of his relatives, having fled to the Church of St. Sophia for sanctuary, a crowd gathered, and a sudden insurrection placed Isaac on the throne, while A., now 73 years of age, was put to death by the infuriated populace, after horrible mutilations and tortures. He was the last of the Comneni on the throne of Constantinople; but the succeeding dukes and emperors of Trebizond were descendants of his son Manuel.

**ANDRONICUS II.:** Byzantine Emperor: reigned 1283–1328: son of Michael Palæologus. After a weak and inglorious reign, he was driven from the throne by his grandson, A. III., who, after a reign equally inglorious, died 1341. During these reigns, province after province was conquered by the Turks.

**ANDRONICUS**—surnamed **CYRRHESTES** from his birth-place, Cyrrhos in Syria: said to have erected the octagonal tower called the Tower of the Winds at Athens, a building of B.C. 3d or 2d c. It probably received its name from figures representing the eight principal winds, and from a brazen Triton which surmounted it, and showed the direction of the wind—the first known weather-cock.

**ANDRONICUS** of Rhodes: a Peripatetic philosopher who lived at Rome in Cicero's time, and employed himself in criticising and explaining the works of Aristotle, a great number of which he was probably the means of preserving to us. None of the writings of A. are extant; for the works ascribed to him are probably the productions of *Andronicus Callistos*, a learned Greek of the 15th c.

**ANDRONICUS, LIVIUS:** see **LIVIUS ANDRONICUS**.

**ANDROPHORE**, n. *ăn-drōf'ōr-ē*, or **ANDROPHORUM**, n. *ăn-drōf'ōr-ŭm* [Gr. *anēr* or *andra*, a male; *phorēo*, I bear]: in *bot.*, a stalk supporting the stamens, often formed by a union of the filaments. **ANDROPH'ORES**, plu. *-ōr-ēz*, in *nat. hist.*, the medusiform gonophores of the Hydrozoa which carry the spermatozoa, and differ in form from those in which the ova are developed.

**ANDROPO'GON:** see **LEMON-GRASS**.

**AN'DROS:** island of the Greek archipelago, the most northern of the Cyclades, separated from Eubœa by a channel, the Doro Channel, 6 m. broad. The island is 21 m. long, and about 8 m. in its greatest breadth. Its e. coast is very irregular. It is very mountainous, and on some of its mountains snow lies during great part of the year. The soil is very fertile, and wine, silk, wheat, barley, lemons, oranges, and pomegranates are produced. Silk is the chief article of export. Pop. 23,700.

The chief town, **ANDROS**, is on a bay of the e. coast. It has manufactures of silk and carpets, and a large port, suitable, however, only for small vessels. Pop. 5,000.

**ANDROSPORES**, n. plu. *ăn'drō-spōrz* [Gr. *anēr* or *andra*, a man or male; *spora*, a seed—from *speirō*, I scatter seed]; the developed male organs in certain of the Algæ; swarm-spores.

**ANDUJAR**, *ăn-dō'hâr*: town of Andalusia, Spain, prov

## ANDVARI—ANELE.

of Jaen, 24 m. n.n.w. from Jaen; on the right bank of the Guadalquivir, at the base of the Sierra Morena. Its streets are irregular, but many of the houses are well built. The river is crossed by an old dilapidated bridge. The situation of the town is not healthful. The inhabitants are mostly employed in agriculture; but there is some trade in grain, fruit, oil, and cattle, the produce of the neighboring country, and the town is famous for the manufacture of the porous cooling clay water-vessels in general use throughout Spain. The Convention of Baylen was signed here, 1808, July 23. Pop. 12,000.

ANDVA'RI, in Norse Mythology: a fish-shaped dwarf, to whom belonged a magic ring, with the curse of gold wrongfully gained. The idea of this legend forms the basis of Wagner's celebrated series of operas, *Das Rheingold*, *Die Walküre*, *Siegfried*, and *Die Götterdämmerung*.

ANECDOTE, n. *ăn'ĕk-dōt* [Gr. *anek'dōton*, not giving out—from *a*, without; *ek*, out; *doton*, given]: *originally*, secret history—*now*, a short story; a matter interesting in a man's life or conduct. ANECDOTAL, a. *ăn'ĕk-dō'tāl*, or AN'ECDOT'ICAL, a. *-ĭ-kāl*, pertaining to.

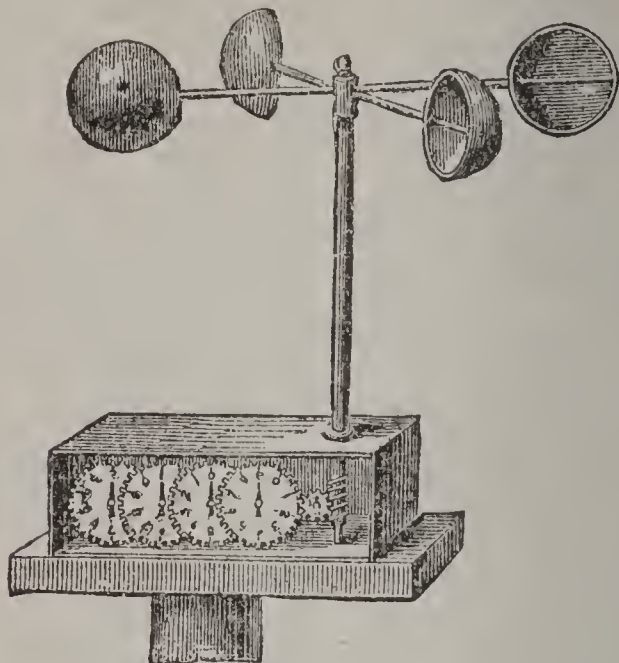
ANEGADA, *â-nā-gā'dā*: most northerly of the Lesser Antilles; lat. about 19° n., long. between 64° and 65° w. It contains about 13 sq. miles. It belongs to England. It is of coral formation, being like most islands of the kind, low and beset by reefs. One reef in particular, which runs out 10 m. to the s.e., is marked, even on ordinary maps, as the scene of numerous shipwrecks. Pop. little more than 200.

ANELE, v. *ăn'ēl'* [AS. *mēlan*, to anoint with oil—from *ele*, oil: F. *huile*, oil]: in *OE.*, to anoint with holy oil; to give extreme unction; also ANEAL.



## ANEMOMETER

**ANEMOMETER**, *án'ě-móm'ě-ter* [see ANEMOSCOPE], (Fr. *anémomètre*, Ger. *Windmesser*): instrument for measuring the strength and velocity of the wind. The simplest and best A. is that which is generally known as Robinson's hemispherical-cup A. (see fig.). It consists of four hollow



Robinson's Hemispherical-cup Anemometer.

hemispheres or cups fixed to the ends of two horizontal iron rods crossing each other at right angles, and supported on a vertical axis which turns freely. The cups revolve with a third of the wind's velocity, and the instrument is so constructed that 500 revolutions are made while a mile of winds passes over it. The revolutions are registered by a system of wheels similar to those of an ordinary gas-metre. The difference between two readings gives the number of revolutions passed over during the intervening time, from which the miles can be calculated, and the rate per hour.

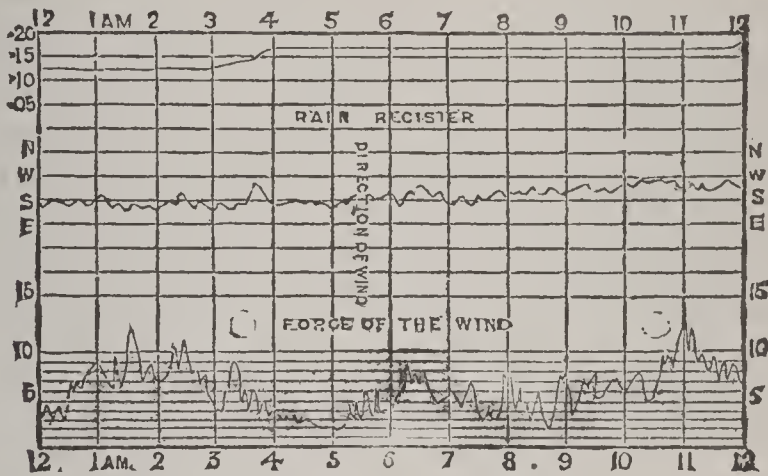
The following table gives approximately the relation of the height of the water in the A. to the force and velocity of the wind in winds of different characters (see AERODYNAMICS):

|                        | Height of<br>water. | Pressure per<br>square foot. | Velocity<br>per hour. |
|------------------------|---------------------|------------------------------|-----------------------|
| Feeble wind . . .      | $\frac{1}{64}$ in.  | $\frac{13}{160}$ lbs.        | $4\frac{1}{16}$       |
| Fresh breeze . . .     | $\frac{1}{4}$ "     | $1\frac{3}{10}$ "            | $16\frac{1}{4}$       |
| Very strong wind . . . | 1 "                 | $5\frac{2}{10}$ "            | $32\frac{1}{2}$       |
| Tempest . . .          | 4 "                 | $20\frac{8}{10}$ "           | 65                    |

Pressure anemometers are of very great importance in meteorological observatories. Of these, the most complete is that invented by Osler. In this instrument, the force of the wind is ascertained in a different way from the hemispherical-cup anemometer. A brass plate one ft. square is suspended by means of springs, and being attached to the vane of the instrument, is maintained at right angles to the direction of the wind. This plate, by the action of the wind, is beaten back upon the springs, and

## ANEMOMETER.

in so doing, causes a pencil to move backward and forward on a sheet of paper placed below it. This sheet of paper is made to pass under the pencil in a direction at right angles to its oscillation; and by means of clock-work, moves at a uniform rate, so that the force of the wind at any particular time of the day is recorded with perfect accuracy. A pencil



Register-sheet of an Osler's Anemometer.

in connection with the vane, and moving in the same transverse line as the former, records the changes in the direction of the wind; and a third pencil, guided by a rain-gauge, registers the quantity of rain that has fallen. The preceding sketch, taken from the first half of a daily register-sheet, gives an idea of the kind of record made by an Osler's A. The space between two upright lines indicates an hour; that between two horizontal lines in the rain-register,  $\frac{1}{20}$  of an inch of rain, in the direction of the wind two cardinal points, and in the force of the wind 1 lb. of pressure on the square foot.

Thus, on the day in which these lines were traced, there was in the rain-register, brought over from the former account, between .10 and .15 of an inch; and during the twelve hours, the pencil had only risen one space, indicating a fall of .05, or  $\frac{1}{20}$  of an inch, almost entirely between 3 and 4 A. M., and immediately before 12 noon. If the day had been very rainy, and the pencil had risen to the top of the register, it would have fallen immediately to the bottom of it, and begun a new account; and it might have done so several times in the course of the twelve hours. This would have been effected by the mechanism connected with the rain-gauge, which enables the gauge to empty itself each time that the pencil reaches the top of the rain-register. As regards the direction of the wind, it was, during the first six hours, s., veering slightly towards the e.; and for the last six hours, it was tending decidedly towards the w., being between 10 and 11 nearly w. From the line marking the force of the wind, it will be seen that the day was stormy. Between 1 and 2, and at 11, the wind was blowing a very high gale, producing a pressure of upwards of 12 lbs. on the sq. ft.; and between the hours of 4 and 5, there was a decided lull, the wind being brisk, but not stormy (2-3

## ANEMONE.

lbs.). The hemispherical-cup A. and the pressure A. are equally indispensable in fully equipped observatories. The former registers the quarterly wind which passes over the place, but cannot register the force of those sudden and almost instantaneous gusts of wind to which storms and hurricanes owe their destructive energy.

In Lind's A., the wind, entering the mouth of one of two upright glass tubes, connected below, depresses the column of water contained in the one tube, and raises proportionately that in the other. This A. is convenient for rough purposes.

ANEMONE, n. *ă-nēm'ō-ně*, also spelt ANEM'ONY, n. *-ō-nī* [Gr. *anēmōnē*—from *anēmos*, wind]: the wind-flower, so named because easily moved by the wind, or because many of the species are found in very exposed situations; genus of plants of the natural order *Ranunculaceæ*, having an involucre of three divided leaves, more or less remote from the flower, a petaloid calyx, scarcely distinguishable from the corolla, and soft woolly achenia (see *ACHENE*), which in some species have tails. The species are numerous, and generally beautiful. Most of them flower



*Anemone coronaria.*

early in spring. They are natives of temperate and cold climates, chiefly of the n. hemisphere. One species, *A. nemorosa*, the Wood A., is a common native of all parts of Britain, and its white flowers, externally tinged with purple, are an ornament of many a woodland scene and mountain pasture in April and May. Another species, *A. pulsatilla*, the PASQUE FLOWER, adorns chalky pastures in some parts of England at the same season. Its flowers are purple and externally silky. The Garden A. is a favorite florist's flower; the varieties are very numerous, and whole works have been published on them and their cultivation, which is most extensively carried on in Holland, and has prevailed from a very early period. It is generally supposed that all these varieties have originated from two species, *A. coronaria* and *A. hortensis* or *stellata*. Both are natives of the Levant;



## ANEMONE.

the latter is found also in Italy and the s. of France. By cultivation, the size of the flower is increased, its form and colors are modified, and many of the stamens are often changed into small petals, forming a sort of *heart* of the flower. The cultivation of the *A.* requires great attention. It prefers a light soil. The root, which consists of clustered tubers, is taken up after flowering. The plant is propagated by parting the roots, or by seed. In the latter way new varieties are obtained. Seedling plants do not flower till the second or third year.—Besides the species which have been named, others are occasional ornaments of flower-gardens. *A. Apennina* and *A. pratensis* have beautiful blue flowers. They are both natives of the s. of Europe. *A. Japonica*, a most beautiful species, has recently been introduced from Japan. The species of this genus are acrid, and have been used for rheumatism, tænia, etc. Anemonine is a crystallizable principle, of active properties, obtained from them. For *Pulsatilla*, see PASQUE FLOWER.—Among the indigenous species of the United States, those with many carpels are *A. Carolina*, 3–6 in., 10–20 sepals, Ill. and s.; Small-flowered *A.* (*A. parvifolia*), 3–12 in., 5–6 sepals, Lake Superior, n. and w.; Many-cleft *A.* (*A. multifolia*), 6–12 in., involucreal leaves narrowly 3-cleft, Vt. and w., rare; Long-fruited *A.* (*A. cylindrica*), 2 ft., fruit-head cylindrical, s. New England and w.; *A. Virginica*, 2–3 ft., fruit-head oval, common. With few carpels is *A. Pennsylvanica*, the fruit-head spherical, w. New England and west. The Pasque-flower (q.v.) and Wood *A.*, or Wind-flower, are immigrants.

ANEMONE, SEA: popular name of the species of *Actinia* (q.v.) and some other *Actiniadæ*. It seems to have been applied to them first about a century ago by Ellis, one of the most celebrated investigators of the department of

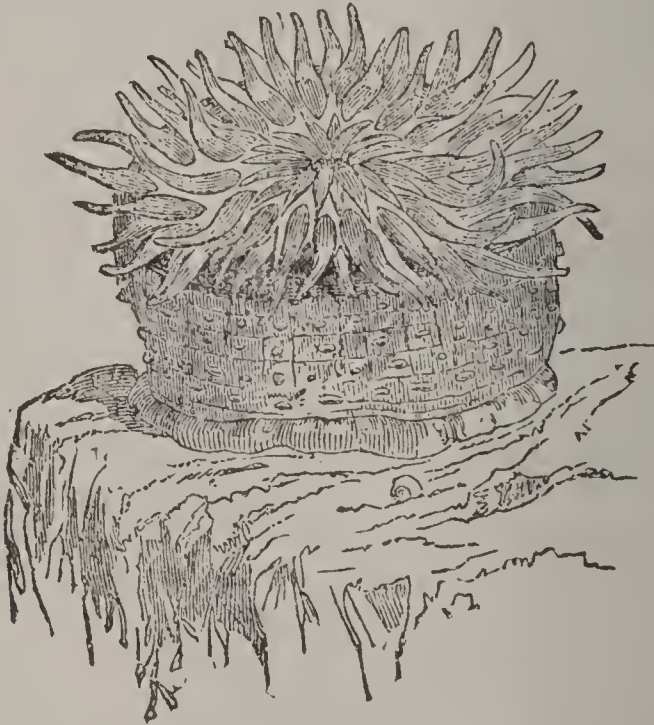


*Actinia Mesembryanthemum.*

natural history to which they belong, who remarks that 'their tentacles, being disposed in regular circles, and tinged with a variety of bright, lively colors, very nearly represent the beautiful petals of some of our most elegantly fringed and radiated flowers, such as the carnation, mari-

## ANEMONE.

gold, and anemone.' It is only, however, when in their proper element and undisturbed, that the sea-anemones expand their tentacula and exhibit their beauty. When left dry by the receding tide, they contract into a jelly-like mass, usually hemispherical or conical, with a puckered hole in the top. The most common of all the British species of sea-A. is the *Actinia Mesembryanthemum*, which has received its specific name from another floral association. It attaches itself to rocks and stones from low-water almost to high-water mark, and when left by the tide, appears as a sub-conical liver-colored or greenish mass, not more than 1-1½ inches in diameter, which, when touched, is found to be very smooth and slippery, but of rather firm consistency. The tentacula, when fully extended, are in length nearly equal to the height of the body, and are nearly of the same color. An azure line frequently encircles the base; and on the base are dark-green lines converging towards the centre, and



*Actinia crassicornis.*

which are formed by radiating vertical plates in the fleshy substance of the animal, analogous (although not calcareous, to the calcareous partitions in the single-starred madrepores. Around the margin of the mouth there is a circle of azure tubercles, like turquoise beads of the greatest beauty. These are to be seen only when the mouth is expanded. They are about twenty-five in number in full grown specimens. Their use is not known, though they have been conjectured to be eyes.—A smaller species, *Actinia* (or *Sagartia*) *trogloodytes*—olive-green, with snow-white stripes and numerous tentacula, is common on the British shores, inhabiting holes in the rocks, often the deserted holes of the *Pholas*, above which its oval disk and tentacula scarcely rise, and into which it quickly withdraws upon being disturbed. A number of species inhabit holes as this does.—*Actinia* (or *Bunodes*) *coriacea*, which attains a diameter of



## ANEMONE.

two inches, attaches itself to sand-covered rocks, and is often much buried in the sand. It is covered with pale perforated warts, which have the power of agglutinating to themselves sand, gravel, fragments of shell, etc.; so that, when the tide is out, the animal is readily passed over by the inexperienced eye as a mere inequality in the surface of the sand, unless some accidental pressure cause it to squirt out water through its tentacula; as, in such circumstances, many of the species are very apt to do, sometimes to the annoyance of those who incautiously meddle with them.—

*Actinia (Bunodes) crassicornis* is one of the largest and most beautiful British sea-anemones, being about four inches in height, and fully more when expanded between the tips of the opposite tentacula. It exhibits great diversity of the most beautiful colors. Red is usually predominant; the surface of many is variegated with white, or with orange-green and yellow. It occurs almost totally white, cream color, sulphur yellow, and bright scarlet with pale warts like ornamented beads. Beauty of color and form are still more abundantly lavished on *Actinia Dianthus*, a still



*Actinia Dianthus.*

larger species, with very numerous tentacula, which inhabits deep water. *Anthea Cereus* is, on some parts of the coast, one of the most abundant sea-anemones. Its tentacula are from 120 to 200 in number, are longer than in the *Actiniæ* generally, and are incapable, it is said, of being retracted, as in the true *Actiniæ*, but remain constantly expanded, and are almost never completely at rest.

Of all the species, *Actinia Mesembryanthemum* is perhaps most easily kept in an aquarium. It not unfrequently changes its place, and its locomotion is an interesting subject of observation. It will subsist for a considerable time without supplies of food, but readily

accepts morsels of beef or mutton, fish, or almost any kind of animal food, drawing it in by their tentacula.

A common A. of the n.e. United States coast is *Metridium marginatum*, with countless tentacles in tufts; when not unfolded, it resembles a pale tomato, e.g., seen on wharf-piles at low water. Some forms are long and worm-like. *Cerianthus borealis* is gigantic, living in a leathery tube in mud, at depth of 600 ft. in the Gulf of Maine. A China species is 2 ft. in diameter.

Sea-anemones are extremely voracious. Dr. Johnston



## ANEMONE.

illustrates their voracity, and their power of reproducing organs of their own body by this anecdote: 'I had once brought to me a specimen of *Act. crassicornis*, that might have been originally two inches in diameter, and that had somehow contrived to swallow a valve of *Pecten Maximus* of the size of an ordinary saucer. The shell, fixed within the stomach, was so placed as to divide it completely into two halves, so that the body, stretched tensely over, had become thin and flattened like a pancake. All communication between the inferior portion of the stomach and the mouth was of course prevented; yet, instead of emaciating and dying of an atrophy, the animal had availed itself of what undoubtedly had been a very untoward accident, to increase its enjoyments and its chances of double fare. A new mouth furnished with two rows of numerous tentacula, was opened up on what had been the base, and led to the under-stomach: the individual had indeed become a sort of Siamese twin, but with greater intimacy and extent in its unions.' (*British Zoophytes*, i. 235.)

As inmates of the aquarium, sea-A. are apt to prey upon their fellow-prisoners. 'Simple contact of the tentacula,' says Sir J. G. Dalyell, 'is the prelude of destruction. Some animals, as if conscious of their inevitable fate, seem paralyzed by the touch, and yield without a struggle. Others, whose size and strength should insure indemnity, are held in the relentless grasp; the tentacula crowding faster and faster around, until the victim is speedily swallowed alive.' There appears to be in other marine animals an instinctive horror of the tentacula of the sea-A. The hermit-crab will instantaneously flee out of its shell, if the shell is caught by them. It is now believed that, like the *Acalephæ* (q.v.) and the *Hydras* (q.v.), the sea-A. possess a power of benumbing their prey. Sea-worms (*Nereides*) have been observed first to writhe, and then to become paralyzed. Little elliptical capsules are in some species scattered over the whole surface of the body; in others, confined to the tentacula, or even to their tips. These are furnished with spicula or minute spears, by which it is probably that not only are wounds inflicted, but poison is also conveyed into them. The sensations produced by the touch of the tentacula appear to be very different in the case of different persons, from a mere 'rasping feeling' on the withdrawal of the hand, to a slight tingling, and even to a stinging as by a nettle. The *Anthea Cereus* possesses the stinging power in a much greater degree than the ordinary *Actiniæ*. Probably the skin of the human hand is in general too thick or hard to be pierced by their fine spicula. Dr. A. Waller, of Birmingham, discovered that, on submitting the tip of his tongue to the tentacula, a pungent pain and stinging, as by a nettle, were the constant result. He also found that a thin India-rubber membrane grasped by the tentacula retains the microscopic 'poison-darts' sticking on its surface. Some of these are only two or three times the length of the capsule which contains them, or at most  $\frac{1}{100}$  part of an inch; but others are much longer, and when within the capsule, are coiled up after the manner of a watch-spring. The capsules

## ANEMOSCOPE—ANEROID.

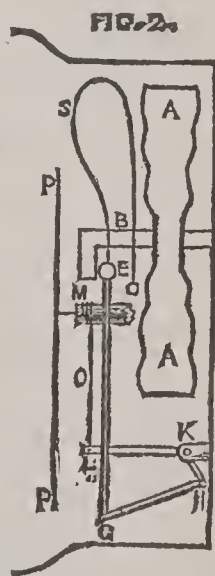
are therefore called *filiferous* or *thread capsules*. This thread is highly elastic, and the expulsion of it, as of the shorter spicula, is affected, Mr. Gosse tells us, by organs having this for their special office.

**ANEMOSCOPE**, n. [Gr. *anēmos*, wind; *skopēō*, I view]: an instrument to show the course of the wind. **ANEMOMETER**, n. *ăn'ě-mōm'ě-tēr* [Gr. *metron*, a measure]: an instrument for determining the course, the force, and velocity of winds. **AN'EMOM'ETRY**, n. *-trī*, the measurement of the force and velocity of the wind.

**AN-END**, *ăn-ěnd'*: a maritime term relating to the position of any mast or boom when perpendicular to the plane of the deck or other level from which it springs. When a top-mast is in its proper place at the head of the lower mast, it is said to be 'an-end.'

**ANENT**, prep. *ăn-něnt'* [AS. *on'gean*, opposite: Sw. *on gent*, on opposite]: regarding; concerning; respecting.

**ANEROID**, n. *ăn'ěr-oyd* [Gr. *a*, without; *nēros*, wet, moist; *eidos*, form]: the air barometer invented by M. Vidi of Paris, in which the pressure of the air is measured without the use of liquid, as in ordinary instruments. The face of the A. barometer (see Fig. 1) has a diameter of about five inches; and the case behind, which contains the mechanism (see Fig. 2), is about two inches deep. The pressure of the



Aneroid Barometer.

atmosphere acts upon a circular metal box, AA, about three inches in diameter, and  $\frac{1}{4}$  of an inch deep, which has been nearly exhausted of air, and then soldered air-tight. The sides are corrugated in concentric rings, to increase their elasticity, and one of them is fixed to the back of the brass case which contains the whole. The amount of exhaustion is such that if the sides of the box were allowed to take their natural position, they would be pressed in upon each other, and to prevent this they are kept distended, to a certain extent, by a strong spring, S, fixed to the case, which acts



## ANEURISM.

upon the head of the stalk, B, attached to the side next the face. When the pressure of the air increases, there being little or no air inside the box to resist it, the corrugated sides are forced inward, and when it diminishes again, their elasticity restores them to their former place; and thus the little box becomes a spring extremely sensitive to the varying pressure of the external atmosphere. Supposing the two sides pressed inward, the end of the spring, E, will be drawn towards the back of the case, and carry with it the rod, EG, which is firmly fixed into it. EG, by the link GH, acts on the bent lever, HKL, which has its axis at K, so that, while the arm, KH, is pushed to the right, LK is moved downward. By this motion, a watch-chain, O, attached at L is drawn off the little drum, M, and the index-hand, PP, which is fixed to it, would move from the position represented in Fig. 1 to one towards the right. When the contrary motion takes place, a hair-spring moves the drum and the hand in the opposite way. By this mechanism, a very small motion of the corrugated sides produces a large deviation of the index-hand,  $\frac{1}{2}\frac{1}{20}$  of an inch causing it to turn through three inches. The A. barometer is graduated to represent the inches of the mercurial barometer. Both from its small size and construction, it is extremely portable, and consequently a very useful instrument; but from its liability to change from time to time, it must be frequently compared with the mercurial barometer. The 'Metallic Barometer' of M. Bourdon is a modification of the A. principle.

ANEURISM, n. *ăn'û-rîzm* [Gr. *aneurus'ma*, the dilatation of an artery—from *aneuru'no*, I enlarge—from *eurus*, broad]: a pulsating tumor consisting of a sac or pouch into which blood flows through an opening in an artery. The sac of an arterial A. may be formed in the first instance by one or more of the tunics of the vessel, generally the outer one, the two inner having given way. This is called a *true* A., in contradistinction to the *false*, in which the sac is formed of cellular tissue condensed by the blood flowing into it after a wound has been inflicted on the artery from without. Should the sac give way, and the blood escape among the tissues, the A. is said to be diffused. Varicose A. is when the sac communicates both with an artery and a vein; Aneurismal Varix, when these vessels communicate without any sac intervening; both of these generally result from bleeding performed by non-professional persons, may arise from some wound, rupture, or ulceration; they may prove fatal by their pressure on some important part, or by bursting and allowing a sudden escape of blood. They are cured by the deposit, within the sac, of fibrin from the blood—a result the surgeon can promote by obstructing the artery above the A. by compression or by ligature; applying the latter close to the sac, if the A. is of the 'false' variety, but at a distance, if it is the result of disease. Internal Aneurisms are treated by those remedies which moderate the heart's action. The term A. is applied also to enlargement or dilatation of the heart. ANEURISMAL, a *ăn'û-rîs'măl*, pertaining to.



## ANEW—ANGEL-FISH.

ANEW, ad. *ă-nū'* [AS. *a*, on, and *new*]: again; newly; another time.

ANFRACTUOSE, a. *ăn-frăk'tū-ōs* [L. *anfractus*, a turning or bending round]: in *bot.*, wavy or sinuous, as the anthers of gourds and cucumbers; full of turnings or windings.

ANGEIOLEUCITIS: see ADENITIS.

ANGEL, n. *ăn'jěl* [Gr. *ang'gelos*, a messenger, an angel: L. *an'gelus*]: a heavenly being (see ANGELS); in *OE.*, a gold coin, in value from 6s. 8d. to 10s. ANGELIC, *ăn-jěl'ík*, or ANGEL'ICAL, a. *-i-kăl*, partaking of the nature of angels. ANGEL'ICALLY, ad. *-lī*. ANGELICITY, n. *ăn'jěl-īs'i-tī*. ANGELICA, n. *ăn-jěl'ĩ-kă*, a plant, so named from its supposed virtues, Ord. *Umbellif'ěræ*. AN'GELOLOGY, n. *-ōl'ō-jī* [Gr. *logos*, discourse]: the doctrine of angelic beings. ANGELUS, n. *ăn'jěl ūs*, in the *Rom. Cath. Ch.*, a prayer to the Virgin Mary beginning with the word *angelus*, a bell being rung morning, noon, and evening for its recitation.

ANGEL: an ancient English gold coin, varying in value from 6s. 8d. to 10s. It was so called from the figure of the



Angel of Edward IV.

archangel Michael piercing the dragon upon its obverse. Angels continued to be coined down to the time of the Commonwealth.

ANGEL-FISH: name used for two families—the Teliost *Ephippidæ*, e.g., the A.-F., Moon or Spade-fish, of our coasts; and the *Squatidæ*, e.g., the *Monk-fish*. The latter is



Angel Fish.

very nearly allied to the sharks, and was included by Linnæus in the genus *Squalus*. See SHARK. It is very voracious, preying chiefly upon fishes. It attains

## ANGELICA.

a length of seven or eight ft.; and the body is broad and flattened horizontally. The head is nearly round, and broader than the body, from which it is separated by a very distinct neck; the mouth is extremely large, and at the extremity of the snout; the eyes are on the upper part of the head, and are very small; behind the eyes are large spout-holes; the skin is very rough, and covered with tubercles. The upper parts are of a gray color; the under parts, dirty white. The female is said to produce seven or eight young in spring and autumn.

ANGELICA, *ăn-jěl' i-k'i*: genus of plants of the nat. order *Umbelliferae* (q.v.), by some botanists divided into two: *A.*, and *Archangelica*. The species are mostly herbaceous and perennial, natives of the temperate and colder regions of the n. hemisphere. They have bipinnate or tripinnate leaves. WILD *A.* (*A. sylvestris*) is a common plant in moist meadows, by the sides of brooks, and in woods in Britain and throughout many parts of Europe and Asia. The root is perennial, short, ringed, and branched; it is white within, and contains a yellow milky juice. The stem is hollow,  $1\frac{1}{2}$ –5 ft. high, often flecked with red; the umbel is convex. GARDEN *A.* (*A. Archangelica* or *Archangelica officinalis*) is a biennial plant, becoming perennial when not allowed to ripen its seeds. It has greenish flowers in almost spherical umbels. The stem is as high as a man. The fruit is long and straw-colored. The root is long and fusiform, an inch or more in thickness, with thick irregular rugose radicles. The whole plant, and especially the root, is aromatic and bitter, containing much resin and essential oil. The root is admitted into the pharmacopœia as an aromatic stimulant and tonic, and in some countries is used in nervous ailments, and in indigestion and flatulence. The root of *A. sylvestris* is sometimes substituted for it, but is much weaker.—The Garden *A.* was at one time much cultivated for the blanched stalks, which were used as celery now is; but its cultivation for this purpose has long been almost entirely



*Angelica archangelica.*

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## ANGELICA TREE—ANGELS.

discontinued. The tender stalks and midribs of the leaves, candied, are still, however, a well-known article of confectionery, and an agreeable stomachic; the roots and seeds are employed in the preparation of gin and of 'bitters.' The plant is a very doubtful native of Britain, but is common in many parts of Europe, and even in Lapland and Iceland. The Laplanders use it as food, its stalks roasted as medicine. In N. America a species, *A. Curtisii*, occurs in the Alleghanies, also 3 species of *Archangelica* (has calyx teeth), one woodland, one coastwise, one on river banks.

ANGELICA TREE. see ARALIA.

ANGELICO, FRA: see FIESOLE, FRA GIOVANNI DA.

ANGELL, JAMES BURRILL., LL.D.: educator: b. Scituate, R. I., 1829, Jan. 7. After graduating at Brown Univ. 1849, he travelled in Europe, and having returned 1853 he was appointed to the chair of modern languages and literature in Brown Univ. He was editor of the *Providence Daily Journal* 1860-66, and then was made pres. of the Univ. of Vermont. In 1871 he was chosen pres. of the Univ. of Michigan, which post he left 1880-1 under appointment as U. S. minister to China and as chairman of a special commission to negotiate a treaty with that empire. At the completion of this work he returned to the presidency of the university; U. S. minister to Turkey 1897-8; again resumed presidency of the university.

ANGELO, MICHAEL: see MICHAEL ANGELO.

ANGELS: in Jewish and Christian theology, a class of superior spirits, represented as the immediate instruments of Divine Providence. As Scripture contains no complete and systematic account of angels, the belief of the church respecting them, except in a few points, has never been exactly defined. It has always been held that A. and human souls, notwithstanding the high origin of the latter, are distinct; only Dionysius Areopagita (q.v.) and a few modern speculators have maintained the contrary. Dionysius, in his *Hierarchia Cœlestis*, divides A. into nine orders. Whether there are not spirits superior both to men and A., has been a disputed point. As to the number of A. and their names, the church in the middle ages repeatedly checked the tendency to go beyond the usually received accounts; a Rom. Cath. council, 745, mentions with reprobation the use of the unwonted names of Uriel, Raguel, Simiel, etc. The names that have all along been in most common use are Michael, Gabriel, and Raphael.

The creation of the A. was placed, by the Platonizing church-fathers, before that of the material world; others assigned it to some one of the six days. Equally various were the opinions as to the nature of the A. The second synod of Nice (787) assigned them a subtle, ethereal, or firelike body; the scholastics, on the other hand, and the Lateran Council of 1215, maintained their immateriality; while others, owing to the appearing of A., mentioned in Scripture, attributed to them the power of assuming momentarily the corporeal form. The poet Nonnus (Egypt, 5th c.) is the first to speak of angels' wings.



## ANGER.

The belief in *guardian A* was common both to heathens and Jews, and had been reduced to system by Philo; and the doctrine was adopted in the Christian Church, and defended by Origen and others, founding on Matt. xviii. 10; Acts xii. 15. It has been cherished by many in all ages and of all parties, but has never been decided on by the church. Some of the fathers also spoke of good and bad guardian-angels, the former of whom were always ready to prompt to good actions, and to avert evil, while the latter were equally quick for mischief, wickedness, and calamity. From the belief in the guardianship of A., and their participation in the government of the world, arose naturally the early practice of invoking and worshipping them. Many Christian teachers condemned it, appealing to Col. ii. 18; and the Council of Laodicea, 300, called it disguised idolatry. But after the Council of Nice had conceded that though A. were not to receive divine worship, they might receive a reverential obeisance, the practice mentioned became more and more rooted, and continues in the Greek and Rom. Cath. Churches.

ANGER, n. *äng'gër* [L. *angor*, sorrow—from *ango*, I pain: Icel. *angr*, pain]: the feeling of resentment mingled with pain; strong indignation excited by real or supposed injury; rage; displeasure: V. to provoke; to enrage. AN'GERING, imp. ANGERED, pp. *äng'gërd*. ANGRY, a. *äng'grĭ*, displeased; provoked; raging; in *med.*, applied to a wound inflamed and painful. ANGERLY, ad. *äng'gër-lĭ*, *OE.*, for ANGRILY, ad. *äng'grĭ-lĭ*, in an angry manner.—SYN. of 'anger, n.': wrath; choler; ire; rage; resentment; indignation; displeasure; fury; passion; gall; spleen; vexation; grudge;—of 'angry': passionate; hasty; provoked; displeased; raging; infuriated; inflamed; choleric; furious; wrathful; hot; indignant; irritated; resentful.

ANGER: displeasure or vexation accompanied by a passionate desire to break out in acts or words of violence against the cause of the displeasure; which must, of course, be, or be considered as, a sentient being capable of feeling the infliction. Like most other emotions, it is accompanied by effects on the body, and in this case they are very marked. The arterial blood-vessels are highly excited; the pulse, during the paroxysm, is strong and hard, the face becomes red and swollen, the brow wrinkled, the eyes protrude, the whole body is put into commotion. The secretion of bile is excessive, and it seems to assume a morbid consistency. In cases of violent passion, and especially in nervous persons, this excitement of the organs soon passes to the other extreme of depression; generally this does not take place till the A. has subsided, when there follows a period of general relaxation. The original tendency to A. differs much in individuals according to temperament; but frequent giving way to it begets a habit, and increases the natural tendency.

Anger is often injurious to health; it may immediately give rise to bile-fever, inflammation of the liver, heart, or brain, or even to mania. Other evil effects may result from

repeated paroxysms—such as paralysis, jaundice, consumption, and nervous fever. The milk of a mother or nurse in a fit of passion will cause convulsions in the sucking child; it has been known even to occasion instant death, like a strong poison.—The control of A. is a part of moral discipline. In a rudimentary state of society, an active exercise of A. seems a necessity for restraint on selfish aggressions. As society develops under laws, the activity of A. is restricted; yet the emotion is not extirpated, since it is one of the elements in the background of the efficacy of law.

ANGERMANLAND (Swedish, *Ångermanland*, *ōng'ēr-mān-lānd*): former division of Sweden, now chiefly comprised in the län of Westernorrland, extends along the Gulf of Bothnia, and is watered by the river Angermann. It has great variety of wild and beautiful landscape—wood, mount, stream, and lake; vieing with the banks of the Rhine, the Danube, or the far-famed scenery of Switzerland. In addition it is one of the best cultivated districts in Sweden, producing barley, rye, and peas, and abounding in excellent pasturage. The river Angermann, about 225 m. long, is in its lower course navigable for the largest ships, and broadens into a lake shortly before reaching the Gulf of Bothnia. The inhabitants are notable for sobriety and industry, giving the district general prosperity. The chief town is Hernöesand (pop about 5,000), located on the small island of Herno. It has steam communication weekly with Stockholm, and is the see of a bishop.

ANGERS, *ōn'zhā*, formerly ANGIERS: ancient *Juliomagus* or *Andegavum*: city of France, formerly cap. of the Duchy of Anjou, now of the French dept. of Maine-et-Loire; on both sides of the navigable river Mayenne, 4 m. n. of its junction with the Loire, 60 m. by rail s.w. of Le Mans. A. is the see of a bishop, and was the seat of a university founded 1246; instead of which it has now an acad. of the highest class. It has also a theol. seminary, an institution for the deaf and dumb, a large picture gallery, and a public library of 40,000 vols. At the famous milit. coll. formerly here, now removed to Saumur, Lord Chatham and the Duke of Wellington received a portion of their education. The ruins of the ancient castle of the dukes of Anjou, built by St. Louis in the 13th c., are here (see ANJOU.) The cathedral of St. Martin is a fine building of the 9th c., in the Roman basilica style. Great slate quarries are near. Pop. of commune (1891) 72,669; (1901) 82,398.

ANGEVIN, a. *ān'jē-vīn*, or ANJEVINE, *vīn*: pertaining to Anjou (q.v.).—The A. Kings of England were of the family reigning 1154–1485, that were ancient governors of Anjou, and were known in history as the Plantagenets (q.v.). The royal houses of York and Lancaster were both of the A. race.—A. Period in Eng. history 1154–1204, i.e., till the loss of Normandy.—A. Architecture, a mediæval style originating in Anjou, with the bay over each vault raised dome-like in the centre.

ANGHIARI, *ān-gē-ā'rē* (anc. *Castrum Angulare*): town



## ANGIENCHYMA—ANGLE.

of Central Italy, province of Arezzo, Tuscany; 10 m. n.e. from Arezzo; on the slope of a hill near the Sovarà, one of the head-waters of the Tiber. In 1440, a battle was fought here, in which the Milanese were defeated by the Florentines. Pop. 1,500.

**ANGIENCHYMA**, n. *ăn'jĩ-ěng'kĩm-ă* [Gr. *anggeĩ'on*, a vessel; *eng'chũma*, an infusion—from *eng'chũō*, I pour in]: in *bot.*, vascular tissue in general.

**ANGINA**, n. *ăn-jĩ'nă* [L. *angĩna*, quinsy—from *ango*, I choke or strangle]: an inflammation or tumor in the throat, impeding respiration. **ANGINAL**, a. *ăn-jĩ'năl*, or **ANGINOSE**, a. *ăn'jĩ-nōs*, pertaining to angina. **ANGINA PECTORIS**, *pěk'tō-rĩs* [L. *pectōris*, of the breast]: an accompaniment of certain forms of heart-disease in which a most excruciating pain in the breast is felt, with a sense of strangulation.

**ANGINA PECTORIS**, *ăn-jĩ'nă pěk'tō-rĩs*, or **HEART-STROKE**: is characterized by intense pain and sense of constriction, which occur in paroxysms beginning at the breast-bone, or deep in the chest, and extending towards the left shoulder. The fits recur, and the patient either dies in one of them, or from effusion of fluid within the chest.

A. P. rarely occurs before the fiftieth year, and is caused by some defect in the vascular or nervous supply of the heart itself; but the exact seat of the disease has not yet been ascertained, and, indeed, probably varies with the individual. The paroxysms are induced by any excess in diet, by exertion, as walking uphill or against a boisterous wind, or by mental emotions. As, during the paroxysm, but little can be done, 'whoever is subject to fits of the heart-stroke, should studiously shun all occasions of having his feelings roused or his passions warmly interested. If he is prone to anger, he must either endeavor to restrain his passion, or must withdraw from scenes likely to awaken it. If he feels keenly contradiction, disappointment, or insult, he had better avoid all disputes in which he may meet either one or the other. He must lead a sober, quiet, and temperate life, in which neither the emotions of the soul are to disturb the functions of the body, nor corporeal affections are allowed to disturb the serenity of the mind.'—*Craigie*.

**ANGIOGRAPHY**, n. *ăn'jĩ-ōg'ră.fĩ* [Gr. *anggeĩ'on*, a vessel; *graphē*, a description]: a description of the vessels in the human body.

**ANGIOSPERMS**, n. plu. *ăn'jĩ-ō-spěrmz* [Gr. *anggeĩ'on*, a vessel; *sperma*, seed]: plants which have their seeds incased or inclosed in a seed-vessel. **AN'GIOSPER'MOUS**, a. *-spěr'mũs*, term in Botany, applied to phanerogamous plants which have their seeds inclosed in a pericarp. This is the case with the greater part of phanerogamous plants. Those which have the seeds naked, as the *Coniferæ* (q.v.), are called *Gymnospermous*. In the Linnæan system, one of the two orders of the class *Didynamia* is called *Angiospermia*.

**ANGLE**, n. *ăng'gl* [L. *an'gũlus*, a corner: Gr. *ang'kulos*, bent: AS. *angel*, a fish-hook]: any corner small or large; the point or corner where two lines meet; a hook to fish with; in *OE.*, a fishing-rod: V. to try to catch fish with a



## ANGLE

hook; to endeavor to gain by insinuations or artifices. AN'GLING, imp.: N. fishing; the art of fishing. ANGELED, pp. *äng'gld*: Adj. having angles or corners. AN'GLER, one who fishes; a kind of fish, also called the fishing frog. ANGULAR, a. *äng'gū-lér*, sharp; pointed; having angles or corners. AN'GULARLY, ad. *-lī*. ANGULARITY, n. *äng'gū-lär'ī-tī*, the quality of having corners or angles. ANGLE-IRON, n. a rolled bar of iron of an angular shape for forming the edges of bridges, safes, etc., or the corners of boilers, etc. SALIENT ANGLE, in *mīl.*, the angle formed by the two lines of a parapet which projects towards the enemy. RE-ENTERING ANGLE, in *mīl.*, the reverse of salient—that is, having the apex of the angle towards the defenders. SECTORAL ANGLE [*sectoral*, forming the sector of a circle]: an angle formed by the prolongation of the faces of any work forming a salient angle. ANGLE OF ELEVATION, in taking aim, the angle formed by two lines, one passing from the eye to the object, the other coinciding with the bore of the piece. ANGLE OF INCIDENCE, the angle formed by the line taken by a projectile, terminating at the point where it strikes the surface, and the line of the ground extending from the same point in the direction of the source of projection; in *optics*, *acoustics*, etc., more generally, the angle formed by the line of a ray of light, heat, or wave of sound at the point where it strikes or impinges on a surface, and a perpendicular line raised on the same surface from the same point. RIGHT ANGLE, an angle or corner formed by a perpendicular line falling on a horizontal line or surface, subtended by a quarter of a circle or 90°. ACUTE ANGLE, an angle or corner less than a right angle. OBTUSE ANGLE, an angle or corner greater than a right angle. TRIANGLE, a three-sided figure having three angles. SPHERICAL ANGLE, an angle formed by the meeting of two arcs of a great circle.

ANGLE, in Geometry: the opening or inclination of two lines that cut or meet one another. If the lines are straight<sup>t</sup> the A. is *rectilinear*. The magnitude of an A. depends, not upon the length of the lines or legs, but upon the degree of their opening. If the legs are supposed closed, like a pair of compasses, and then gradually opened till they come into one straight line, they form a series of gradually increasing angles; when half-way between shut and straight, they contain a *right* A. Any A. less than a right A. is called *acute*, and one greater, is called *obtuse*. Angles are measured by degrees, of which a right A. contains 90. The A. made by two curved lines (*curvilinear*) is the same as the A. made by the tangents to the two curves at the point of intersection. Angles made by planes with one another can also be reduced to rectilinear angles. When three or more planes meet at the same point, the angular space included between them is called a *solid* A.



Angle.

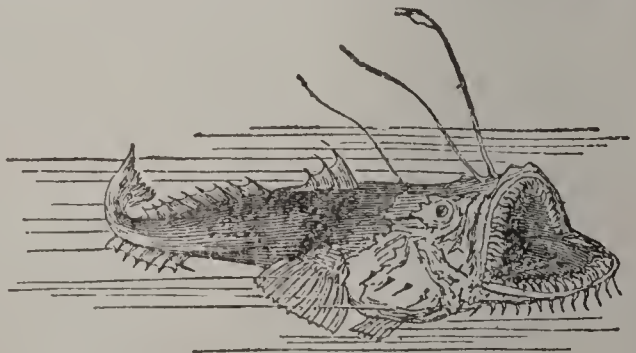
The FACIAL ANGLE, on which Camper founded a scheme for estimating the degrees of intellect and sagacity bestowed by nature on the several members of the animal kingdom,

## ANGLE—ANGLER.

was measured by him in the following way: One straight line was drawn from the ear to the base of the nose, and another from the prominent centre of the forehead to the most advancing part of the upper jawbone, the head being viewed in profile. 'In the angle produced by these two lines,' says the physiologist, 'may be said to consist not only the distinction between the skulls of the several species of animals, but also those which are found to exist between different nations of men. The heads of birds display the smallest angle, and it always becomes of greater extent in proportion as the animal approaches most nearly to the human figure. Thus there is one species of the ape tribe in which the head has a facial angle of forty-two degrees; in another animal of the same family, which is one of those *simiæ* approaching most closely to the human figure, the facial angle contains exactly fifty degrees. Next to this is the head of the African negro, which, as well as that of the Kalmuc, forms an angle of 70 degrees, while the angle discovered in the heads of Europeans contains 80 degrees. On this difference of 10 degrees in the facial angle, the superior beauty of the European depends; while that high character of sublime beauty which is so striking in some works of ancient statuary—as in the head of the Apollo and in the Medusa—is given by an angle which amounts to *one hundred degrees*.'

**ANGLE, DEAD:** in fortification, where an angle of the wall is so formed that a small plot of ground in front of it can neither be seen nor defended from the parapet, it is called a 'dead angle.' See **BASTION: CURTAIN: FORTIFICATION.**

**ANGLER,** *äng'glër* (*Lophius piscatorius*): a fish common on American shores; sometimes called the *Fishing-frog*; sometimes, from its ugliness and voracity, the *Sea devil*. It usually attains a length of about three ft., sometimes five ft. The head is enormously large, depressed, and spinous; the mouth is of similar proportions (whence the Scottish name *Wide Gab*), and furnished with many sharp curved teeth. The lower jaw is considerably longer than the upper. The body is narrow in comparison with the great breadth of the head, and tapers rapidly to the tail. The whole fish is covered with a loose skin, almost without scales. There



Angler.

are two dorsal fins, which are spinous, and three anterior rays, regarded as belonging to the first dorsal, are free and articulated to the head, which are with great probability supposed to serve the animal as delicate organs of touch. The nostril tube is elongated into a membranous stalk, capable of spreading out like a cup at the upper end, and of



being moved in every direction by a very numerous set of muscles, the bottom of the cup being divided into projecting leaflets, on which the olfactory nerve is finally distributed. There are also numerous worm-like appendages about the mouth, and by means of these, and still more of the filaments which rise from the upper part of the head, the creature is supposed to attract small fishes, upon which it seizes. The wonderful stories told upon this point require authentication, yet they are not incredible, and have been current concerning this fish and its congeners since before the days of Aristotle, who mentions them, and says that this fish is called a *fisher* because of the means by which it procures its food. Yarrell justly remarks of the stratagem ascribed to the *Lophius*, that it is not more wonderful than that of spiders, which spin and repair their webs to catch insects, upon which they subsist.—The genus *Lophius* belongs to a family of Acanthopterygious Fishes, called *Lophiadae* or *Lophioids*, and by Cuvier, *Pectorales Pedunculati*, remarkable for the elongation of the carpal bones, so as to form a sort of wrist, to the extremity of which the pectoral fin is articulated; so that, by means of it, these fishes are able to leap suddenly up in the water to seize prey which they observe above them; and some of them can hop about upon sea-weeds or mud from which the water has retired. They do not suffer so quickly as most other fishes from being out of the water, their gill-opening being very small, and they have often been known to devour flounders or other fish caught with them. The bones are much softer than those of Acanthopterygious Fishes in general.

ANGLES, n. plu. *äng'glz* [L. *Angli*, the Angles]: a German tribe on the Elbe, of the race of the Sue'vi, who afterwards passed over with the Saxons into Britain and gave their name to that country. ANGLE-LAND, *äng'gl-länd*, England. ANGLO, *äng'glō*, prefixed to a proper name, denotes partly English, as, Anglo-Indian, Anglo-American. ANGLO-SAXON, or ANGLO-NORMAN, a stage of the English language in its progressive development into its present form. ANGLO-SAXON, -*säks'ön*, partly English and partly Saxon; denoting the language arising from the *Angle* and *Saxon* dialects, spoken in Britain from about A.D. 450–1066. ANGLO-MANIA (q. v.), a passion on the part of a foreign country for imitating whatever is English.

ANGLES (*Angli*): German tribe of the race of the Suevi, who seem originally to have occupied the country e. of the Elbe, between the mouths of the Saale and the Ohre, and moving northward, to have settled in Schleswig, between the Jutes and the Saxons. With the latter the A. passed over in great numbers to Britain, during the 5th c., and ultimately established there the Anglo-Saxon (q. v.) kingdoms of the Heptarchy. From them England derives its name (Lat. *Anglia*, Anglo-Saxon, *Engla-land*). After these migrations from Schleswig, the Danes from the n. entered the deserted districts, and mingled with the A. who remained there. The German language and manners were afterwards introduced by immigrant nobles from Holstein, and



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prevailed among the higher classes; but to the time of Christian VI., the Danish was still generally spoken by the common people. During the present century, the German has more completely gained the ascendancy. The modern Angles are of a more passive disposition than the Frieslanders and the people of the Dithmarsch, and religious sentiment is very strongly manifested among them. The district called *Angeln* extends from the Schlei on the s. to the Flensburg Hills on the n. about 330 sq. m.; pop. about 50,000. The name has no political or administrative signification.

ANGLESEA, *ang'gl-sē*, HENRY WILLIAM PAGET, Earl of Uxbridge and Marquis of A.: 1768, May 17—1854, April 29: was educated in Oxford, and, as Lord Paget, entered the army at the beginning of the French Revolution. From 1793–4 he commanded a volunteer corps in Flanders, and subsequently acquired a high reputation as a cavalry officer in the Peninsular war, especially during the retreat under Gen. Moore. At the battle of Waterloo, where he commanded the British cavalry, he lost a leg. On his return to England, he received a vote of thanks from parliament, and was made Marquis of A. Afterwards he took a part in the administration under Canning, and in 1828 was appointed lord-lieutenant of Ireland, at a period when that country was greatly agitated on the question of its religious privileges. He at first opposed the emancipation of the Rom. Catholics; but ultimately became convinced that it was essential to the peace of the country, in consequence of which he was recalled from Ireland by Wellington in 1829. He was again appointed to the same office under Lord Grey's administration in 1831; but the perverse policy of the tories had involved matters in such perplexity that even the decisiveness and integrity of his character could not allay the irritation. O'Connell had now commenced his career of agitation, which influenced A. to severe coercive measures. He founded the Irish Board of Education, which has been of immense service to that nation. In 1846, he accepted the office of master-general of the ordnance in Lord John Russell's ministry,—and was raised to the dignity of field-marshal.

ANGLESEY, or ANGLESEA [Sax. *Angles' Ey*, i.e. 'the Englishmen's island']: island and county of Wales, on the n.w. coast; separated from the mainland by Menai Strait. Its form is that of an irregular triangle, the base facing the mainland; length about 21 m.; breadth about 17; coast-line, about 80; area, 193,453 acres. The climate is mild but foggy, especially in autumn; the soil, generally a stiff loam, varying with sandy and peaty earth; the general aspect of the island, flat and uninteresting, there being very little wood; the prevailing rock is mica schist; limestone ranges traverse the county; granite, marble, coal, serpentine, soapstone, are also found. The island is rich in minerals; the Parys and Mona copper-mines, near Amlwch, were opened in 1768. Lead ore, containing much silver, has been found. The manufactures of A. are inconsiderable. Agriculture, though still backward, has in recent years made considerable advance. Increased attention has also

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been given to the breeding of cattle and sheep. The number of acres under all kinds of crops, bare fallow, and grass, 1881, was 147,548; under corn crops, 26,954; under green crops, 9,742. The number of horses used for agricultural purposes was 7,217; of cattle, the number was 44,918; of sheep, 38,146; and of pigs, 14,797. Communication with the mainland is by the Menai suspension bridge, and the great Britannia tubular bridge, over which the Chester and Holyhead railway passes. See TUBULAR BRIDGES. A. was known to the Romans under the name of *Mona*. It was one of the chief seats of the Druidical power, which in 61 was nearly destroyed by the Roman general, Suetonius Paulinus. The island was again subdued by Agricola, 76. Egbert conquered it in the 9th c.; but the native princes afterwards recovered their dominion, establishing a seat of government at Aberffraw. It was finally subdued by Edward I. The ancient remains consist chiefly of dolmens, two of which, side by side, are in the park of Plas, Newydd, the seat of the Marquis of A. At Holyhead, are the remains of a Roman camp.

The climate of A. is milder than that of the mainland of Wales; but in the autumn the air is frequently filled with noxious mists. The county is divided into three districts, called *cantrefs*, each subdivided into two *cwmwds*. The market-towns are Amlwch (q.v.), Beaumaris (q.v.), Holyhead (q.v.), Llangefni, and Llanerch-y-medd. The first four of these towns united, till 1885, in sending one member to parliament; in that year they were merged in the county. The county returns one member. Pop. (1871) 51,040; (1881) 51,416; (1891) 50,079; (1901) 50,590.

ANGLICAN, a. *äng'glĭ-kăn* [AS. *Angles*, the English: L. *Angli*]: English; pertaining to England: N. a member of the Church of England. ANGLICE, n. *äng'glĭ-sē*, in the English language or manner. ANGLICISM, n. *äng'glĭ-sĭzm*, a way of speaking or writing peculiar to the English language; an English idiom. ANGLICIZE, v. *äng'glĭ-sĭz*, to render any form of expression in another language into the English idiom. AN'GLICIZ'ING, imp. ANGLICIZED, pp. *äng'glĭ-sĭzd*. ANGLICAN CHURCH (see ANGLO-CATHOLIC CHURCH: ENGLAND, CHURCH OF.

## ANGLING.

ANGLING, *āng'gling*: art of fishing with natural or artificial lures placed on a hook at the end of a line—the line usually attached to a rod. It is of great antiquity. It is referred to in the Old Test. (Is. xix. 8), in the records of ancient Egypt and Assyria, and in the polished literature of Greece and Rome. The Greek poet Oppian, in his *Halieutica* (2d c.), gave to the world the first systematic treatise on fishing. After a lapse of 12 centuries, Dame Juliana Berners, or Bernes, prioress of Sopwell, England, wrote the *Booke of St. Albans, a Treatise on Fysshinge with an Angle*. In the latter part of the 15th c. appeared three books on A., by Leonard Marchall, W. G. Faukener, and Samuel Gardiner; and 1653, Izaak Walton's *Compleat Angler* was published; a book which, though having many errors, especially in nat. hist., has so great a charm of style, and is so imbued with the sentiment of the art, that the author is held in reverence as the 'Father of the Craft of all good and true anglers.'

Angling is followed in the fresh waters—on the lakes, ponds, rivers, and spring-fed streams; in the brackish waters—near the mouths of rivers, and on the shallow flats and channel-ways of estuaries; and in the salt waters—in the surf, and on the fishing banks. This diversity of the sport causes the equipment of the angler to vary with the fish to be caught, and with the locality of the fishing. Concisely stated, it consists of a line, a hook, a rod, reel, and sinker. The baits, or lures, are of great variety, and are as often selected in accord with the whim of the angler as they are justified by his practical experience; hence, a detailed description of the equipment of an angler, without reference to the waters fished in or the quarry sought, would be misleading.

*Angling in Lakes and Ponds.*—In the United States and Canada, A. in lakes and ponds is more common than other kinds of fishing, except that in the salt waters adjacent to such large cities as New York and Boston. Lake and pond fishing is of two kinds: trolling and still-fishing from boats. In *trolling*, the boatman rows slowly along the outer edge of the water-grass, or, where that does not grow, he keeps the boat within 40 to 60 ft. of the shore, or rows across the ledges of rock or shallows where fish are usually feeding. The angler sits facing the stern of the boat and allows the line to trail 20 to 200 ft. behind, the distance dependent on the depth of water and the habits of the fish to be lured. The *rod* used should be a stout one, 8 to 10 ft. in length, and weighing 7 to 12 oz., according to the size of the fish sought. The *reel* should be of the kind known as the 'multiplier,' in which, at every revolution of the handle, the barrel revolves two to four times, thus taking up the line very rapidly. The reel should be large enough to hold at least 50 yds. of line, and in all kinds of *bait fishing* should be placed in front of the hand-piece on the rod, where it is held firmly by a movable ring or slide. The line should be of cotton rather than linen; those known as 'Cuttyhunk,' Nos. 9 to 18, suit every purpose. The *baits*, or *lures*, used in trolling are numerous, the spinner,



or spoon, being most popular. These are of various sizes, and are attached to the end of the line, where they spin or twirl in an attractive manner as the boat moves slowly through the water. Live and dead fish also are in use as baits, and a device consisting of a live minnow incased in a glass tube, to which three gangs of hooks are attached, is a most deadly lure. A live fish used in trolling should be hooked through both lips; with a dead fish, the hook should be passed through the gill and inserted in the fleshy portion of the tail. The trolling *hooks* should be at least three-eighths of an inch in the bend, and of approved quality. In trolling and still-fishing for large fish, a *gaff* is used in landing the fish: it consists of a strong wrought-iron hook, not less than three inches across the bend, attached to a handle 3 to 5 ft. long.

*Still-fishing* in lakes and ponds is the reverse of trolling. The boat is anchored on selected ground, and the fish are sought at the bottom or in mid-water. The rod should be lighter and more elastic than that used in trolling, the reel and hook smaller, and the lures of a different character; of these, the best is a live minnow, hooked just back of the first dorsal fin, care being taken not to strike the spinal cord with the hook. Garden worms, crickets, roaches, hellgrammites or dobson (the larva of a species of dragon-fly), are favorite baits. A common practice is to 'ground-bait' the selected water, which consists in depositing food for the fish the night before the fishing. Another form of A. in ponds and lakes is *casting from the reel*, the angler standing on the shore or in the boat. The rod used in this method is about  $7\frac{1}{2}$  ft. long, very springy, but of sufficient backbone for handling a line at least 150 ft. in length. The reel is a very free-running multiplier, and the bait a live minnow, the hook being passed through both lips. In casting, the line is reeled up to within 2 or 3 ft. of the tip of the rod, which is made to sweep rapidly from rear to front, giving an impetus and outward direction to the minnow, which should strike the water 50 to 150 ft. from the shore, according to the skill of the caster. The art in making a good cast of this character lies in the curve and speed of the sweeping rod, and in the knack of stopping the line as it runs from the reel, at the instant when the minnow strikes the water. See CASTING.

*Angling in rivers* is done mostly from boats or from the shores, by trolling, still-fishing, and casting from the reel, and does not differ materially in tackle and baits used, except when the fish sought is the black bass. This fish is considered by most anglers the game fish *par excellence* of American waters. In shallow rivers, where deep pools and alternate rifts prevail, it is fished for by casting the artificial fly, and by still-fishing with live minnows and other natural baits. In the former method, the angler wades the stream, placing his flies upon the water in a manner similar to that of casting for trout, except that the flies are allowed to sink an inch or two below the surface, and then, by continuous twitching of the tip of the rod, are made to simulate the action of a struggling and drowning insect. The

*flies* in use are larger than the ordinary trout-flies, and more gaudy in coloration. Any of these so called fancy flies will lure the black bass, the favorites being the Royal Coachman, the Furguson, the Jungle-cock, the Polka, and Turkey winged flies, which are kept in stock by fishing-tackle dealers. The *rod* should be at least 10 oz. in weight, and 10 ft. in length; the reel, a small multiplier, holding 30 yds. of letter D enamelled, water-proof silk line, tapering 5 to 6 ft. from the outer end. In bait-fishing for black bass in rivers, the boat is usually anchored at the foot of a rapid, and the minnow (dead or alive) is impaled through both lips and cast into the current.

*Angling in Spring-fed Streams.*—These waters are fished usually for salmon and trout, but in the streams of Mich., Mont., and the states w. of the Rocky Mountains, are found two species of fish, the grayling and the mountain whitefish, equally prized with the trout by anglers. Both rise freely to the artificial fly, and are found in the same or adjacent waters. The feathered lures that attract the latter are equally killing for the grayling and the whitefish, and both are fished for in the same manner as trout.

*Fly-fishing for Trout.*—Though this beautiful charr is often caught by common natural baits, such as the garden worm, pieces of meat, fish-roe, and even cheese, and is quite often taken by the trolling spoon and other artificial lures, the accepted and scientific method is by casting the artificial fly. To do this properly, a rod is required 6 to 7 oz. in weight, 9 to 10½ ft. long, with sufficient elasticity and backbone to cast the line 40 to 50 ft. Lighter rods (weighing as low as 2½ oz., and 7 ft. in length) are every season coming into more general use; but the beginner should not venture casting with a rod less than 6 oz. in weight. The tyro, in making his first cast, should take from the reel with the left hand, the right grasping the rod above the reel, line equal in length to the rod; then, with a backward and upward flirt of the rod, send the line to the rear, which, when extended to full length, should, by a forward spring or flirt of the rod, be brought again to the front and fall, end first, upon the water. The rod should be lightly held by the hand-grasp, which is on the butt-piece, and the motion given to the rod should be of the gentlest character. By practice of these simple directions, lengthening the line as progress is made, anyone with the faculty of learning the art will soon become an efficient fly caster. The *reel* used in fly-fishing is ordinarily that known as a 'click reel,' which has a simple and somewhat musical device that prevents the line from running too freely. It should be large enough to hold 25 to 30 yards of letter F enamelled water-proof silk line. In *fly fishing*, the reel is placed near the lower end of the butt, and the rod is held above the reel. The *creel*, a basket slung with a strap over the right shoulder, should be of wicker-work, unless an extended angling tour is intended, when a leather creel, so made as to fold in a small space, will be most convenient. Due care should be taken to keep it clean and sweet, by scouring after use, and hanging it, inside out, in the sun for



a few hours. The stock of flies should be kept in a *fly-book*. Many forms of these are made, the best having hooks by which the gut (snoods) of each fly can be kept extended and available for immediate use, thus averting loss of time in soaking the snoods when on the fishing water. A very useful article is a *leader-box*, in which the leaders are placed between pieces of felt, which are kept moistened, so that the leaders are always in condition for use, being free from kinks or dryness, and less liable to break when used in a hurry. The *leader* is made of silk-worm gut, 3 to 9 ft. long, and is attached to the casting or reel line by a small single bow-knot. At the outer end of the leader a fly is attached, also one or more at 15 to 18 in. apart. The first fly is called the 'end,' or 'leader-fly,' the others 'drop' flies. Various methods are in use for attaching the latter to the leader, but a simple loop made in the leader (some of these are sold with loops ready made), through which the loop on the snood, or gut, of the fly is drawn tight, is the simplest and strongest way of attaching them. A *landing-net* is an important adjunct to a trout angler's outfit. These nets can be bought of various forms in the stores; that known as the collapsing net, which comes apart and occupies only the space of a walking-cane, is the best, being as strong as the old styles, and more convenient to transport. In fishing a rapid trout-stream, it is well to use a long-handle net with a spike in the butt-end, as it will be handy for a supporting staff. In fishing for trout with the artificial fly, in running waters, the utmost care should be taken not to disturb the pools, wherein the trout are apt to lie. When practicable, it is best to fish up-stream, as the trout lie heads to the current. A cast of 30 to 40 ft. is generally made, longer ones are seldom necessary.

*Flies used in Trout-fishing.*—More than 1,500 different patterns of flies, each with a separate name, and without classification, are made, and many of them are kept in stock by the dealers. By this great variety of forms and colorations, much diversity of opinion has been created among anglers as to the value of many flies for practical use, with the result that two classes exist among trout anglers: the 'colorist,' who believes that the minutest gradation or tint in the dressing of flies affects the feeding humors of the fish; and the 'formalist,' who ignores coloration, and thinks that size and shape only are attractive to the trout. Old anglers are in the habit of choosing a medium between these extremists. They use comparatively few flies, and choose those of cardinal colors as far as practicable. Of these, the following is a representative list:—Brown Palmer, or Hackle; Black Palmer; Ginger Palmer; White Miller; Black Gnat; Red Ant; Cowdung; Coachman; Red Spinner; Alder; Red Fox; Grizzly King; Jungle Cock; Professor; Yellow Sallie; Queen of the Waters; Seth Green.

*Angling for salmon* is nearly identical in general methods with that for trout, except that larger rods and flies are used, and casting is done with both hands; the salmon being much heavier than the trout, greater care in handling the fish must be taken. However, a good trout angler is a good



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salmon fisherman by intuition. The flies used in salmon-fishing number about 200; few, however, of the fancy patterns are esteemed by experienced salmon anglers, who confine themselves to the use of the Jock Scott, the Silver Doctor, Durham Ranger, Black Jay, Butcher, and a few other standards kept in stock by dealers.

*Salt-water Angling.*—The methods of A. in salt water are somewhat similar to those in fresh water. In the tidal portions of rivers, the boat is anchored either in the tideway on the edge of the channel, or in the eddies; and the line, with a light *sinker* attached, is allowed to drift with the tide, or is weighted sufficiently to sink the bait on or near the bottom. The *rod* varies in weight according to the fisherman's skill in handling it, but it should never be less than 10 oz., nor more than 16 oz., and when the tide is not swift 6 oz. should be preferred. The *reel* should hold 50 to 100 yds. of line, and have a free-running action with a drag attached to prevent over-running of the line. The *baits* in use are the crab (those known as 'peelers,' or 'shedders,' and the soft-shell or 'paper' crab), shrimp, mussels, clams (hard or soft), eel-tails, and pieces of dead fish, especially of the menhaden or mossbunker. Salt-water fish are not as fastidious in feeding as those of fresh water. The size of the *hook* depends on the fish to be caught, but those known as 1-0 to 4-0 will hold the fishes usually taken near the coast line. In fishing on the shallow flats and in the channel ways of estuaries, the same tackle and baits are used as at or near the mouths of rivers. In all localities for salt-water fishing, the tide is an important factor in success, except on the Fishing Banks, where the fish are apt to bite freely at all conditions of the tide. In most localities, the incoming tide gives the greatest success; but in others, slack water, low tide, and the ebb, are the most favorable. *Fishing in the surf* for striped bass, drum, bluefish, and large weakfish (the latter known as 'tide-runners,' or 'yellow fins'), is a favorite method with anglers who have mastered the rudiments of the art. The principle of casting is identical with that above described in minnow-casting for black bass, except that a heavier rod (12 to 16 oz.) is used, and the cast is made with both hands, and either crab, menhaden, or eel tail bait is best. A 2-oz. sinker is generally used. The caster stands at the edge of the surf, and hurls the heavy bait and lead among or beyond the outer breakers, reeling the line in slowly as the undertow sweeps the bait shoreward. Casts of 260 ft have been made by experts. *Trolling for bluefish* is done from a sailboat, usually, when strong winds prevail, the line trailing astern 100 ft. or more. The bait is either a whole menhaden or other fish, dead or alive, or the squid, the latter being an oblong piece of lead with a strong hook soldered to it. *Chumming* is another favorite method. The boat is anchored on a selected spot, and a quantity of dead menhaden are cut into small chunks, which, when thrown overboard, create an oily trail or 'slick,' which is a powerful attraction for the fish; the latter are then caught on rods of 7 to 8 oz. in weight, with a piece of menhaden as bait.—On the Fishing Banks, thousands of anglers, for sport, throng,

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every day in the season, the excursion steamers that ply between the fishing banks and the large coast-line cities, particularly New York. These vessels are fitted out especially for this purpose, having commodious decks from which the fishing is done, small ice-chests, tackle closets, with fishing-gear and baits, adapted to the sport, for sale or hire. They leave the city docks early in the morning, returning before dusk, which allows 5 to 6 hours for fishing. Arriving at the banks, the vessel is anchored, and hundreds of lines drop into the water, the hand-line being in the majority. The bait used is generally a raw clam, on a strong Virginia hook, attached to a heavy line, which is usually successful in hauling in large weakfish, blackfish, sea bass, and codfish, the latter weighing sometimes as much as 30 pounds.

*Angling for Tarpon* — This fish is the largest caught on rod and reel. It grows to a length of 6 feet, and individuals weighing 205 lbs. have been taken on a baited hook. It belongs to the herring family, and inhabits semi tropical waters; being abundant during the spring and summer months on the e. and w. coasts of Fla., with straggling specimens as far n. as Long Island. The method of angling is to anchor the boat on their feeding grounds, and to cast a mullet bait 50 to 100 ft. along the edge or into the channel. The proper rod is 6 to 7 ft. long, with 600 ft. of No. 15 line, wound on a large free-running reel, with a drag attached. The hook is a large one, sold in the shops as the 'tarpon hook.' The fish, on taking the hook, will move away slowly, and should be allowed to swallow the bait by the angler paying out 10 to 15 ft. of line. When it feels the resistance of the line, the tarpon leaps immediately 5 to 6 ft. into the air, often repeating this six or seven times, when exhaustion usually ensues, and the fish is then reeled to the boat, gaffed, and towed into shallow water to be boated. Thousands of anglers visit Fla. every year from Jan. to Apr. for this exciting sport.

The literature of A. was comparatively dormant 1653–1800, but during the 19th c. many practical works on A. have been issued, the most important of which are *The American Angler's Book*, by Thad. Norris; *A Book on Angling*, by Francis Francis; *The Scientific Angler*, by David Foster; *Sport with the Rod and Gun* (the Century Co.); *Fish and Fishing*, by J. J. Manley; *The Fishing Tourist*, by Charles Hallock; *The American Angler* (an illustrated monthly magazine, New York). *Fishing with the Fly*, by Orvis Cheney; an edition of *Walton*, by R. B. Marston; *The Game Fishes of North America*, by Wm C. Harris, editor of the *American Angler*; *Fly Rods and Fly Tackle*, and *The American Salmon Fisherman*, both by Henry P. Wells; *The Practical Angler*, by Kit Clarke; *Fishing in American Waters*, by Genio C. Scott. *Favorite Flies*, by Mary Orvis Marbury. A full list of works on A., published to 1882, is in Westwood's *Bibliotheca Piscatoria*.



## ANGLO-AMERICAN—ANGLO-CATHOLIC CHURCH.

ANGLO-AMERICAN, n.: native of England who has become a resident of America (especially of the United States); also a descendant of such a native. ADJ. pertaining to or connected with both England and the United States, or with both peoples, or with English now resident in America.

ANGLO-CATHOLIC CHURCH, or ANGLICAN CHURCH: a term frequently employed as collective designation of those churches which embrace the principles of the English Reformation. The following are, in brief, the views generally entertained of those principles by the members of the churches in question. By referring the Anglo-Catholic Church to the English Reformation, it is not meant that its origin dates from that event, but that its tenets are those of the Reformation. For, as the word 'church' itself suggests—being derived, like 'kirk' in Scotland, from the Greek adjective *kuriakē*, which means '*the Lord's*' (i.e. *house*)—the origin of the Anglican Church is to be traced not to a Roman, but to an eastern, source. The A. Church claims the name of Catholic—also from the Greek *katholikē*, universal—because claiming to be united, in origin, in doctrine, and in form of government, with the Universal Church as it has existed, with various differences of rites and ceremonies, in all countries and in all ages. Eusebius even asserts that some of the apostles passed over into Britain. Tertullian, 2d c., speaks of places in Britain which, though inaccessible to the Romans, were subject to Christ: *Britannorum inaccessa Romanis loca, Christo vero subdita*. At the Council of Arles, 314, there were three British bishops present; and St. Alban suffered martyrdom, under Diocletian, about the close of the 3d c., or nearly three centuries before the landing of St. Augustine (q.v.) and his missionaries, 596. Christianity, however, was driven by the heathen Saxons into the mountainous districts of Wales; and though Augustine, on his arrival, found no less than seven bishops and one archbishop in those parts, and though Bertha, queen of Ethelbert, was a Christian, yet the whole Saxon part of the country was in a state of heathenism. The British Church differed from the Roman and other western churches as to the form of administering baptism, and the time of keeping the festival of Easter (see EASTER), following the customs of the Greek or Eastern Church; and it was not until the close of the 7th c., under Theodore, that the two churches became united. In the mean time, the conversion of Britain was as much due to the labors of St. Aidan, the Scottish bishop of Lindisfern in the n., and of St. Chad, the Saxon saint, as to the missionaries of the Roman Church in the south. See ANGLO-SAXONS.

This glance at the history of the Anglican Church, in the earlier period of its existence, is important, when we come to consider what and whence are its present form and tenets. From the beginning of the 8th to the middle of the 16th c., this church became gradually, at last completely, assimilated in doctrine and practice to the Church of Rome, as well as subject to her domination: and the freedom from Rome



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which was gained at length is in no small degree due to the freedom and purity of Saxon times. It required a struggle of nearly a century to make the British Church conform to the Roman in relation to baptism and Easter; and the same spirit offered a strenuous, and for some time an effectual, resistance to the peculiar doctrines of the Church of Rome and the claims of papal dominion. There were always found individuals, some of great eminence, to protest against the former, while large sections of the church never ceased to protest against the latter. For 150 years previous to the Reformation, the doctrines of Wickliffe were leavening the body of the Anglican Church. The overthrow of the papal supremacy was indeed effected by Henry VIII.; but that monarch rather hindered than favored the reformation of *doctrine*, as appeared from the rapid progress which it made when Edward VI. came to the throne. The bloody reign of Mary interposed a check to further progress; and it was not until the accession of Queen Elizabeth that the principles of the Reformation finally triumphed, and the Anglo-Catholic Church assumed its present form. During more than 800 years before the Reformation, the A. Church became gradually, and at length completely, merged in the Roman Catholic; at the Reformation, it may be said to have emerged; when Rome, at the Council of Trent, anathematized all who would not receive her articles, the separation became final, and the positions of the two churches with respect to each other irreconcilably hostile.

The doctrines of the A. Church are to be found in the *Book of Common Prayer* (q.v.), which is based upon the second prayer-book of Edward VI., and was settled in its present form 1662. Its tenets are more *legally* defined in the Thirty-nine Articles, settled 1562. See ARTICLES, THIRTY-NINE. As distinguished from Rome, this church rejects tradition as a rule of faith, though admitting it as to rites and ceremonies, and bases all its teaching upon the books of the Old and New Testaments, rejecting from them as apocryphal certain which Rome receives as canonical. Only two sacraments are recognized, Baptism and the Lord's Supper, whereas Rome allows five others—Confirmation, Orders, Penance, Matrimony, and Extreme Unction; the doctrines of transubstantiation and the propitiatory sacrifice of the mass are denied; the Roman practices of adoration of the Virgin, saints, and angels, and reverence of relics and images, also are forbidden; and there is denial of the Roman doctrines of purgatory and the spiritual supremacy of the pope. It is not, however, to be forgotten that a great part of the A. liturgy is derived from the missals of the Roman Church. As distinguished from the Presbyterian Churches—e.g., that of Scotland—the A. Church is Episcopal, holding the unbroken succession of orders from the apostles as one of its most esteemed privileges; whereas the Presbyterians, especially in Scotland, reject prelacy as a remnant of popery. These Pres. Churches do not, however, differ materially from the A. in essential matters of faith, but chiefly as to the sacraments, the form of administering them, and the grace conveyed in them: as to the observance of

## ANGLOMANIA.

seasons, such as Christmas, Lent, Easter; and as to the forms of public worship, the Presbyterians using no set forms other than in their song-service of psalms and hymns. The differences of the A. Church with the Greek Catholics are less wide than with the Roman. See GREEK CHURCH. From the Lutherans this church differs on the doctrine of consubstantiation in the sacrament of the Lord's Supper. From the Calvinists there is a radical difference (i.e., from the genuine and thorough Calvinists) as to the extent of the efficacy of Christ's death, they believing only in 'particular,' this church in 'universal,' redemption (meaning, of course, not that all men will actually be saved, but that Christ died for all); nevertheless, some of the Anglican articles, as the 17th, are decidedly Calvinistic. The numerous sects of Wesleyans, Baptists, and Independents in England do not differ from this church on what they themselves consider essential articles of faith, but chiefly as to the necessity of orders, the grace conveyed in the sacraments, and the forms of public worship and of church government. But since their separation from the National Church, varieties of doctrine and worship have spread among them. Unfortunately, there remains no Gallo Catholic Church with which to compare the Anglo-Catholic Church.

The A. Church embraces the Church of England, the Prot. Epis. Church in Ireland, the Epis. Church in Scotland, the affiliated colonial churches, and the Prot. Epis. Church in the U. S. All but the latter use the English *Book of Common Prayer*; in the United States this has been slightly altered. The Prot. Epis. Church in the U. S. is the most flourishing offshoot of the Anglican. It was planted in Virginia, 1607, but, for nearly two centuries, the mother church in England withheld from her offspring the necessary boon of an independent episcopacy. It was not till the close of the 18th c. that the first three American bishops were ordained (one by the Scottish bishops in 1784, and two by the archbishop of Canterbury and the bishops of Bath and Peterborough in 1787); but now this branch of Anglo-Catholicism has spread over the greater part of the United States. See AUGUSTINE: DUNSTAN: ENGLAND, CHURCH OF: EPISCOPAL CHURCH, PROTESTANT.

ANGLOMANIA (see ANGLES): in German literature, an A. was especially prevalent in the 18th c., when translations of English books became numerous, and were read with great admiration. The Germans have ascribed the sentimental and affected style of some parts of their literature to the influence of the English literature of last century. But the A. was harmless in comparison with the GALLOMANIA, or imitation of French literature and customs, which prevailed in Germany in the time of Frederick II. of Prussia, and was developed in the writings of Wieland. A remarkable A. prevailed in France for some time before the Revolution. It arose out of political considerations and admiration of English free institutions, but extended to trifles even of fashions and manners, and often became ridiculous.



ANGLO-SAXON LANGUAGE AND LITERATURE: a quite modern term for an ancient stage in the development of the English tongue—the ruling race in England before the Norman conquest not knowing itself by any other name than *Ænglisc* or English. Mr. Freeman, Prof. Stubbs, and other scholars of the present day, argue stoutly for a return to the old and true name; and to all appearance the abolition of ‘Anglo-Saxon’ and the restoration of ‘English’ is only a question of time. English is one of the Low German family of Teutonic languages. We do not know it in its earliest form. Some centuries elapse after the invasions of the 5th c. before any literature was produced or recorded. During this time, the dialectic differences of the various Low German tribes who had come into the island were probably diminishing, while separation from their kinsmen on the continent must on the other hand have tended to develop new peculiarities. The result is, that the very oldest English is far from the same as the very oldest dialects of Low German in the coast regions between the Rhine and the Baltic. But it most nearly resembles the old Saxon of Rhenish Prussia and Westphalia, and the old Dutch and the old Frisian of the provinces of Holland, and to the last of these it has the closest affinity. It is not to be supposed, however, that at any time before 1066 Englishmen spoke or even wrote a single dialect. There is evidence of at least two being used—a northern and a southern—an Anglian by the people of Northumbria, and a Saxon by the people of Wessex. The former is the more primitive, and as Mr. Kington Oliphant points out (*Sources of Standard English*, 1873, pp. 35–40), has more in common with old Norse and Frisian than its southern sister; e.g., the infinitive ends not in the *an* of Wessex English, but in *a*. The history of England during the 600 years before the Norman conquest accounts both for the antiquity of the Northumbrian literature, and for the subsequent triumph of the Wessex dialect. In the 7th and 8th centuries, Northumbria was the strongest, the most civilized, and the most learned of the English states. Christianity had poured its benign influences over it in double measure. Paulinus and Aidan, Rome and Iona, had both striven successfully against paganism, and light flowed over the land. Cædmon and Bede and Alcuin were all Northumbrians. That so little of this Northumbrian literature has come down to us is owing to the destruction of the northern monasteries by the Danes. The influence of Alfred, ‘king of the West-Saxons,’ and the unification of government in the island under his successors, gave the dialect of Wessex an irresistible supremacy; so much so, that even most of the early northern literature only survives in a southern dress—e.g., we can read Cædmon only in a Wessex version of the 10th c. Yet, so strong was the impression left on its neighbor by the Anglian state, that not even the havoc made by the Danes of its literary monuments and its political prosperity could prevent its name from being given to the island, the people, and the tongue.

Wessex English, then—that is, the English of the court, of books, and probably in great measure of the schools,



prevailed in England for more than 150 years before the Norman conquest, and is substantially what we mean when we speak of the 'Anglo-Saxon' language. There is no reason to suppose that it ever superseded the dialect of the n. for ordinary purposes of intercourse. Anglian lived on in the mouths of the people, and in later times has won an immortal fame in literature under the name of Lowland Scotch. Cædmon and Burns both used it, though in the unapproachable verse of the Ayrshire bard it has become utterly inorganic, and so remains. English, then, before the Conquest, differs from modern English in being an inflected language. Its inflections are not so rich, or various, or euphonious as those of Latin, or Greek, or Mæso-Gothic, that oldest and noblest of the Low-German dialects; but they are still sufficient to give it a distinct character, and to make it strange and almost unintelligible at first sight to one whose reading does not go back beyond Shakespeare. Its nouns can be grouped into declensions, and classified according to gender, and faint traces of the terminations are preserved in the English of the present day. The *en* in 'children' and 'oxen' is the old *an* of the plural in nouns of the first declension; the *s* and *es*, the old *as* marking the plural of masculines of the third. Adjectives have both a definite and indefinite form. The article is as complete as in Greek, though everything has now vanished but a fragment of the neuter *that* (modern *the*). Some mutilated remains of the pronominal inflections still survive to puzzle schoolboys, and delight the lovers of 'hoar antiquity.' Verbs are divided into 'strong' and 'weak' conjugations, as is still the case in German. The distinction between the indicative and subjective moods, though slight, is real; and we have not only an infinitive in *an*, but a gerund in *enne*, while the present participle in *ende* is not confused with the verbal noun in *ung*, as is unhappily the case with us, who have made *ing* do duty for both. Of late years the study of the English tongue, particularly in its earliest stage, has become almost popular, and grammatical works are now numerous. Besides the fragmentary or discursive contributions to the subject of English grammar by Guest, Madden, Garnet, Grimm, Earle, Morris, Kington-Oliphant, we may specify Rask's *Angelsäksisk Sproglaere* (Stockh. 1817, with Thorpe's translation of 1865); Marsh's *Lectures on the English Language* (1861); Koch's *Historische Grammatik der Englischen Sprache* (1863-1869); Mätzner's *Englische Grammatik* (1865); Latham's *English Language* (1855); March's *Comparative Grammar of the Anglo-Saxon Language* (1870); and Sweet's *Anglo-Saxon Reader* (1877).

In a rapid survey of English literature before the Conquest, one naturally looks to the n. for the earliest examples. The *Runes* graven upon the Ruthwell Cross, set up about 680, are now proved from the inscription itself to be the composition of Cædmon, and are the very oldest relic of Anglian poetry. Here Cædmon speaks his own speech, not, as in his other poems, speaking through a Wessex version. Other and later monuments of Northumbrian English are a *Psalter* (800); the *Rushworth Gospels* (900); the *Lindisfarne*

*Gospels* (970). But the great body of this early literature, whether produced in Northumbria, or Mercia, or Wessex, has come down to us only in the dialect of the last of these states; therefore, in referring to it, not the antiquity of the MS., but of the author comes into view. Much of it is poetical. The verse is alliterative, as in the Norse and oldest German poetry; and only in some of the later poems is there a beginning of rhyme. The epic or narrative poems are remarkable for superabundance of often-recurring epithets, bold metaphors, and a certain pomp and magnificence of style. Of the genuine heroic poetry, however, there are few remains, the principal one being the poem of *Beowulf* (q.v.), a work which must have been composed before the Angles and Saxons quitted their original seats on the continent. Other pieces produced in Germany, though surviving in only an English form, are the *Traveller's Song* and the *Battle of Finsburgh*. The introduction of Christianity gave a religious character to Anglo-Saxon poetry; and many narrative poems are extant on religious subjects, some of which may be seen in the *Codex Oxoniensis*, edited by Thorpe (Lond. 1842). The *Song of Cædmon* (see CÆDMON), preserved in Alfred's translation of Bede, has been edited by both Junius and Thorpe; and a metrical paraphrase of parts of the Holy Scriptures, ascribed to the same author, has found editors in Thorpe (1832), Bouterwek (1847-54), Grein (1858). Cædmon is said by Bede to have died about 680, so that both of the works in question must belong to the 7th c. Two poems from the *codex* which Dr. Blum discovered at Vercelli in 1832, have been edited by Jacob Grimm (Cassel, 1840), under the title of *Andreas und Elene*; a poetical calendar of the saints by Fox (Lond. 1830); and a version of the Psalms by Thorpe (Lond. 1835). Among the most important prose works are the laws, civil and ecclesiastical, from the time of Ethelbert of Kent to that of Canute, of which the best edition is in Thorpe's *Ancient Laws and Institutes of England* (Lond. 1840). Of historical works are Alfred's translations of Orosius and Bede; and the *Chronicle* carried on by different hands to 1154, of which the best edition, at least down to the Conquest, is Price's, in the *Monumenta Historica Britannica*, 1848, an earlier one being that of Ingram (Lond. 1823). It is in the province of theology that English literature before the Conquest is most rich, abounding particularly in legends and homilies. A collection of homilies made by Bishop Ælfric has been published by the Elfric Society (2 vols., Lond. 1847), a society instituted in 1843 for the promotion of the knowledge of the England and English language of those times. Ælfric did much to enrich it with translations, and began a translation of the Bible. He translated the first seven books, the book of Job, and the apocryphal Gospel of Nicodemus; also a fragment of a poem on the history of Judith, of great celebrity (Oxf. 1698). The *Durham Book*, or St. Cuthbert's book, a very famous manuscript, now in the British Museum, contains an interlinear gloss of the gospels in the East-Anglian dialect, the text being probably of the 8th, and the gloss of the 10th c. Alfred translated the work of Boethius,



*De Consolatione Philosophiæ.* The opinions of Englishmen before the Conquest on astronomy, natural philosophy, and medicine, are exhibited from their works by Wright in *Treatises on Sciences written during the Middle Ages* (Lond. 1841), and Turner's *History of the Anglo-Saxons* (3 vols., 7th ed. 1852). Compare also Thorpe's *Analecta Anglo-Saxonica*; Marsh's *Origin and History of the English Language and the Early Literature it embodies* (1862); and Grein's *Bibliothek der Angelsächsischen Poesie* (1857-61), and his *Bibl. d. Angels. Prosa* (1864). See ENGLISH LANGUAGE: ENGLISH LITERATURE.

ANGLO-SAXONS, *äng'glō-säks'ōnz*: collective name generally given by historians to the various Teutonic or German tribes which settled in England, chiefly in the 5th c., and founded the kingdoms of the Heptarchy. They consisted for the most part of Angles, Saxons, and Jutes. The general opinion is, that the first of these invaders made their appearance in Britain in 449, having Hengest and Horsa as their leaders. But under the more searching scrutiny of later writers, these famous leaders have evaporated into mythical heroes of romance common to most of the Germanic nations; and though the fact of a great Germanic invasion in the middle of the 5th c. is not doubted, it is believed that this was by no means the earliest period at which Germanic settlements were effected in England. Long previous to this period, a portion of the coast, extending from Portsmouth to Wells in Norfolk, was known as the *Littus Saxonum*; but whether in reference to Saxons by whom it was settled, or to roving adventurers of that race by whom it was ravaged, is still a subject of dispute. Of the three tribes mentioned above, the Jutes are believed to have been the first comers. Their original settlements were in what is now the district of Schleswig; and the portions of England of which they possessed themselves were Kent, the Isle of Wight, and the opposite coast of Hampshire. The Saxons, who were the next invaders, settled chiefly in the southern and central parts of England—in Sussex, Essex, Middlesex, the s. of Hertford. Surrey, the part of Hampshire not possessed by the Jutes, Berks, Wilts, Dorset, Somerset, Devon, and the portion of Cornwall which did not remain in the possession of its former Celtic inhabitants. The Saxons who invaded England probably belonged chiefly to the portion of that great nation, or confederacy of nations, whose territories lay on the shores of the Baltic—occupying what are now the district of Holstein, the n. of Hanover, and the w. of Mecklenburg. The third tribe, whose name and nationality afterwards prevailed over the others—the Angles—did not arrive till a somewhat later period. Coming like the Jutes from the district of Schleswig, a corner of which is still called Angeln, they made (527-547) a succession of descents on the coasts of Suffolk and Norfolk, and latterly, on the country to the n. of the Humber, and the s. part of Scotland between the Tweed and the Forth. Eventually, the Angles obtained possession of the whole of England, except the portions already mentioned; that is to say, of all the part to the n. of



the Avon, on the one side, and the Thames on the other—Essex, Middlesex, and part of Hertford excepted. The union of different bands of these conquerors among themselves, with their countrymen who had preceded them, and with the Celtic population which, though conquered, there is no reason to suppose was exterminated, gave rise to the so-called Heptarchy (q.v.)—the kingdoms of Northumbria (originally Bernicia and Deira), Kent, Sussex, Wessex, Essex, East Anglia, and Mercia.

The various independent states into which England had till then been divided were united by Egbert, king of Wessex, 827, into the one kingdom of England (the land of the Angles). The royal family of Wessex, which was thus raised to what, for the first time, probably, is entitled to be called the kingly dignity, never again lost its supremacy, except, indeed, during the Danish period (1017-42), till the Norman Conquest; and to it Alfred the Great (q.v.) belonged.

The English constitution, the origin of which is sometimes ascribed to Alfred (849-901), was not framed by him, though he restored it and improved it after the deliverance of the country from the Danes. It was essentially the same as that of other Germanic nations. At the head of the government was the *cynning* or *cynq*. The kingly office, among the Germanic nations in early times, had reference solely to the tribes or peoples governed, and never to the land which they occupied. During this period, it was naturally elective; but after the idea of great territorial possessions came to be inseparable from it, it became hereditary, though a form of election, or color of ascertaining the national will, was still retained. The life of the king, like that of every other man, was assessed at a fixed price (*Weregild* q.v.), which was that of an *ætheling*, or person of royal blood, with a sum superadded as the price of his royalty. The first of these sums went to his family, the second to the people. The king possessed the power of calling together the Witenagemôt (q.v.), and of laying before them propositions for the public weal; but he had not the power of dismissing the assembly, so that in England, from the first, the real centre of power seems to have been in parliament. Neither was the convocation of the Witenagemôt at the option of the sovereign, for there is every reason to believe that his power was all along limited by the necessity of consulting the principal members both of the clergy and laity of the kingdom; nor, it would seem, could he impose taxes, or declare peace or war, without their consent. The sons and other near relations of the king constituted an aristocracy of birth, called ethelings or æthelings (the same word with the German *Adel*, noble). Out of the great officers of the state, or immediate servants of the king, was gradually formed a hereditary aristocracy, closely corresponding to that which subsequently existed in feudal times. Of these, the person next in rank to the king was the *ealdorman* ('elderman,' Lat. 'senator') or *heretoga* ('army-leader'). 'But inasmuch as the ducal functions, in the Anglo-Saxon polity, were by no means confined to service in the field, the peculiar title

of heretoga is very rarely met with, being for the most part replaced by ealdorman or aldorman, which denotes civil as well as military pre-eminence' (Kemble, *ut sup.* ii. 126). Though the word is derived from an adjective signifying age, in practice, no such meaning attached to it, more than to senior, which is the original form of the word seigneur. It was to the same class of officials that subsequently the Danish title of *eorl* or earl came to be applied. The powers of these officers probably varied in the different kingdoms, while they remained separated; but we shall form, on the whole, an accurate conception of the position of the ealdorman, if we regard him as the governor of the *gá* or shire, the *scirgeréfa* or sheriff being his deputy. Much difference of opinion exists as to the rank and position, social and political, of the thane; and all that can be said with confidence is, that before the Conquest, it was not convertible with ealdorman, or equivalent to baron, as it came to be after the Conquest. The office seems to have implied subordinate landed tenure, similar to that by which the lands of the vassal were held of the lord in feudal times; and thus, while the king's thanes were frequently ealdormen, these, in their turn, had thanes of a lower rank, who appear to have been very numerous. This view is strengthened by the derivation of the term from *thegnian* or *thenian*, to serve, which is the same word as the modern German *diene*n, and from the fact of its being frequently translated *minister* in the Latin charters of pre-Norman times. The whole class of ordinary freemen or commoners were called *ceorls*, afterwards *churls* (a word preserved in the German *Kerl*, and in the Lowland Scotch *carle*), and were generally associated under the protection of some person of rank and influence, who was called the *hlaford* (our 'lord,' but *lit.* 'breadwinner,' or rather 'bread-beginner'). This, however, was in itself no recognized title, and up to a very late period the Anglo-Saxon laws knew no other distinction than that of *ceorl* and *eorl*. The Britons, who retained some degree of freedom, constituted a lower class, called *wealhas* or 'Welsh' (*lit.* 'foreigners,' as they seemed to the conquerors). The number of slaves (*theowas*) was not very great, nor does the character of the servitude imposed on them seem, comparatively speaking, to have been oppressive. Different rights and privileges belonged to the different ranks of the Saxon people, and, as we have already said, a different *Weregild* (q.v.), or pecuniary estimation, was fixed for each rank, as the penalty for homicide. The great districts or shires were subdivided into tithings (*teothunga*), each containing *ten* free heads of families, who were held mutually responsible for each other. Ten tithings formed a *hundred*, which had a court subordinate to the court of the shire. In important matters, the ealdorman of the shire could not decide without the concurrence of an assembly (*Scírgemót*, Assembly of the Shire) of thanes of the shire and representatives of townships, which met half-yearly, and corresponded to the *Witenagemót* (Assembly of the Wise), or *Micelgemót* (Assembly of the Great) for the whole kingdom.



## ANGOLA.

Christianity was introduced among the new comers in the end of the 6th or beginning of the 7th c. by St. Augustine, a missionary sent by Pope Gregory I., called the Great. Augustine became the first archbishop of Canterbury; and before the close of the 7th c., the whole of *Engla-land* was a Christian country under one metropolitan. Ethelbert, king of Kent, was the first sovereign who embraced the Christian doctrine. Bringing with them the traditions and feelings of the empire, the whole influence of the clergy was thrown into the scale of monarchy, and greatly tended to its consolidation. A Christian church, however, already existed in Scotland and the n. of England; and the influence of the Culdees (q.v.), long prevailed against the efforts of the southern prelates to establish uniformity of worship and complete conformity to Rome. But in truth, the English clergy in general were not very submissive to the authority of the popes, who did not succeed in reducing the land to complete subjection till after a long struggle. St. Dunstan (q.v.) gained for them their final victory in the 10th c. During the time of its comparative independence, the English Church was distinguished for the learning and laboriousness of its clergy. Bede (q.v.) is the most eminent author whom it produced. Between his time and that of Alfred, a very great degeneracy had taken place both in the learning and efficiency of the clergy, which that active and enlightened sovereign labored to restore, but with only partial success. St. Boniface (q.v.) and many other English and Scottish missionaries labored with success in the propagation of Christianity in Germany.—Besides the works already referred to, see Freeman's *History of the Norman Conquest*, and *Old-English History*, and Green's histories, especially his *Making of England* (1882).

ANGOLA, *ân-gô'la*: name often applied to the whole of the w. African coast from Cape Lopez de Gonsalvo, lat.  $0^{\circ} 44' \text{ s.}$ , to San Felipe de Benguela,  $12^{\circ} 14' \text{ s.}$ ; but, in a more restricted sense, the name of a kingdom in lower Guinea dependent upon Portugal, and extending from the river Coanza on the s., lat.  $9^{\circ} 20' \text{ s.}$ , to the Danda on the n.,  $8^{\circ} 20' \text{ s.}$  The natives generally call it Donga. The interior is very imperfectly known, and the boundaries uncertain. The country being well watered, is covered with a most luxuriant vegetation. The heat being moderated by the sea-breeze, the orange and other fruits of the warmer temperate climates are produced, as well as those which are strictly tropical. There is a great abundance and variety of wild animals, and the mouths of the rivers swarm with sharks and crocodiles. The principal rivers are the Coanza and Danda. Much of the country is mountainous. The mountains are covered with forests, and are rich in metals, particularly copper, iron, and silver, which, with wax and ivory, are the principal legitimate exports, although the great trade, almost to the present day, has been in slaves. Fetichism is the prevailing superstition, and circumcision is general among the natives. A. might easily be rendered very productive both of sugar and cotton, but the manner in



## ANGON--ANGORA.

which it has been governed by the Portuguese has not tended to develop its resources. They discovered it in 1486, and have had settlements in it since 1488; but the number of resident Portuguese is very small, and they are almost entirely confined to a few spots—forts and commercial establishments called *feiras* or fairs. The capital is Loando, or San Paulo de Loando (q.v.). Pop. of A. supposed about 250,000.

ANGON, *ăn'gõn*: barbed spear used by many early nations. The Franks, in the 7th c., employed angons both for thrusting and hurling. The staves were armed with iron, so as to leave but little of the wood uncovered; the head had two barbs. When hurled or thrust at an opponent, the head of the A. became fixed in the flesh by means of the barbs. This form of spear was largely adopted by the Anglo-Saxon and other Teutonic nations.

ANGORA, a. *ăn-gõ'ră* [so named from *Angōra* in Asia Minor]: denoting a long, fine, white, silky hair, produced by goats so named.

ANGORA, *ăn-gõ'ră* (Ancyra of the ancients): a town, cap. of the Turkish vilayet of the same name, in the mountainous interior of Asia Minor; distant from Constantinople about 220 m. e.s.e. It is said to have been built by Midas, son of the Phrygian Gordius; was a flourishing city under the Persians; became the cap. of the Gallic Tectosages, who settled in Asia Minor about B.C. 277; was a principal seat of eastern trade under the Romans; and was made the cap. of the Roman prov. of Galatia Prima. It was the seat of one of the early churches of Galatia, and the scene of two



Angora Goats.

Christian councils held, respectively, 314, 358. A decisive battle between the Turks and Tatars was fought near A., 1402. in which Timur defeated and took prisoner the sultan Bajazet I. A temple of white marble was erected by the citizens of Ancyra to the emperor Augustus, who had greatly beautified the city, and his deeds were recorded in inscriptions upon a number of tablets and the columns of an altar. One of these inscriptions, the *Marmor Ancyranum*, discov-

## ANGORNOW—ANGOSTURA.

ered by Busberg in 1553, is important for the elucidation of ancient history. They were printed first in Schott's edition of Aurelius Victor (Antw. 1579), and the best edition is Mommsen's *Res gestæ divi Augusti* (2d ed. Berl. 1883). A. is famous for its breed of goats, which have silky hair about eight inches long, from which mohair (q.v.) goods are made. The skins make nice carriage, mats and are used for the manufacture of fine Morocco leather. These goats are hardy, yield a good quality of flesh and milk, are adapted to elevated and rocky regions, and will thrive on rather coarse herbage. They were introduced into the United States about 1848, and small numbers have since been kept, principally at the south. They have not become popular, though now (1893) attracting considerable interest on the Pacific coast. They are kept in some parts of Australia, and 1890 there were nearly 3,000,000 at Cape Colony.—Pop. of the vilayet about 892,900; of the town about 36,000.

ANGORNOW, *ân-gôr-nô'*, or NGORNU: town of Bornu, Central Africa, on the s.w. bank of Lake Tchad; 15 m. s.e. from Kukawa. The surrounding country is very level and monotonous, but fertile. The waters of Lake Tchad are usually some miles distant from the town, yet the whole intervening plain is sometimes covered with water, and the town itself is liable to destructive inundations. It is a place of considerable commercial importance; the principal articles of trade are slaves, cotton, amber, coral, and metals. Pop. supposed about 30,000.

ANGOSTURA, *ân-gôs tô'râ*, or CIUDAD BOLIVAR, *sê-ô-dâd' bô-lê'vâr*: seaport of Venezuela; lat. 8° 8' n., long. 63° 55' w.; on the right bank of the Orinoco, about 240 m. from its mouth. It is built at a point or pass (*angostura*), where, on both sides, the river is narrowed by rocks to a width of 3,134 ft., after having measured 3 m. across at thrice the distance from the sea. The site of A. is only 191 ft. above the sea-level—an elevation which, on the intermediate distance as above, yields an average of less than ten inches to the mile. In fact, the bottom of the river in front of the town is lower than the surface of the sea, for, even in the lowest state of the water, it is said to be 200 ft. deep, with a margin for floods to the amount of 50 or 60 ft. more. Under these circumstances, the bed of the stream must be about 250 ft. under the level of the city, or about 60 ft. under the level of the sea. When the river does rise to its highest, there are at least portions of the city inundated; and instances are believed to have occurred in which careless people were devoured by alligators in the very streets. Chiefly, as is supposed, through the free access of the trade-winds over the flat surface of the country, A. enjoys, in proportion to its latitude, a singularly temperate climate. Even in the hottest season of the year, the thermometer is said seldom to show more than 86° F.; while between the beginning of Nov. and the end of Apr. it ranges from 77° by day to 69° by night.

The situation of A. is highly favorable in a commercial



## ANGOSTURA BARK—ANGOULÊME.

view. The basin of the Orinoco, which lies nearly all above the town, and is estimated to contain 250,000 sq. m., or more than twice the area of the British Isles, is particularly rich towards the n. On that side it reaches very nearly to the coast-line, so as to comprise some of the best parts of Venezuela. Towards the s. it consists, in a great measure, of boundless plains, traversed by countless herds of cattle. Over the whole of this vast basin, and almost equally in both directions, the main stream and its affluents are, with hardly any interruptions, navigable to near the foot of the mountains. Owing to the impetuosity of the currents and the obstruction of shoals, sailing-vessels are said to take fifteen days to sail up to A.; but with steam navigation these impediments would in great measure disappear.

A. was founded in 1764, in place of an older town 115 m. higher up the river. With such advantages of position, A. was a flourishing mart before the commencement of the war of independence; but the civil broils materially interfered with its prosperity. Pop. (1807) 8,500; (1827) abt. 3,000; (1881) 10,861; (1888) 11,686.

ANGOSTURA BARK, or ANGUSTURA BARK, *ăn'gõs-tõ'rà*:- aromatic bitter bark of certain trees of the natural order *Rubiaceæ*, and tribe *Cuspariæ*, natives of tropical S. Amer. It derives its name from the town of Angostura, where it is a considerable article of commerce. It was first brought to England in 1788. It is used in medicine as a remedy for weakness of digestion, diarrhea, dysentery, and fevers. It is tonic and stimulant. The most important of the trees producing it is the *Galipea officinalis*, which grows upon the mountains of Columbia and near the Orinoco. It is a tree of 12-20 ft. high, and 3-5 ft. in diameter, having a gray bark, trifoliate leaves, with oblong leaflets about ten inches long, which, when fresh, have the odor of tobacco, and flowers about an inch long, in racemes, white, hairy, and fragrant. The bark contains a chemical substance not yet sufficiently examined, called *Angosturin*, *Cusparin*, or *Galipein*, to which its medicinal efficacy is ascribed. It is supposed that a variety of A. B. is produced by *Galipea Cusparia* (called by some *Bonplandia trifoliata*), a majestic tree of 60-80 ft. in height, with fragrant trifoliate leaves more than two ft. long. A. B. is believed to be one of the most valuable of febrifuges; but its use is at present very limited, and has, indeed, in some countries of Europe, been prohibited, in consequence of its frequent adulteration with the poisonous bark of the *Strychnos Nux Vomica*, or the substitution of that bark for it. This poisonous bark is sometimes called *False A. B.* It differs from the true A. B. in having no smell, in its much greater weight and compactness, in its inner surface being incapable of separation into small laminae, and in the effects which are produced upon it by acids and other tests, particularly in its outer crust being rendered dark-green, or blackish, by nitric acid, while that of the true A. B. is rendered slightly orange-red.

ANGOULÊME, *õn-gõ-lãm'*: cap. of the dept. of Charente,



## ANGOULÊME.

France, and formerly of the prov. of Angoumois. It is on the Charente, and has narrow and crooked streets, a number of paper-mills, manufactures of woollen stuffs, linen, and earthenware, etc. It possesses a royal college, a museum of natural history, and several other useful institutions. In the centre of the town stands the remnant of the ancient castle of A., in which was born the celebrated Marguerite of Navarre, the authoress of the *Heptameron*, and other works. The railway from Paris to Bordeaux passes through it. Much saffron and wine are produced in the neighborhood. The prov. of Angoumois was in early times a county; but the heir of it, in the beginning of the 14th c., being an adherent of the English, Philip the Fair took possession of it, and it became an appanage of younger branches of the royal family. It was made a duchy by Francis I., and was sometimes bestowed upon natural sons of the French kings. Charles de Valois, Duke of A., a natural son of Charles IX., was a distinguished general in the reigns of Henry IV. and Louis XIII. Pop. (1891) 23,690; (1901) 37,650.

ANGOULÊME, *ôn-gô-lām'*, LOUIS ANTOINE DE BOURBON, Duc d': 1775, Aug. 6 - 1844, June 3; b. Versailles: eldest son of Charles X. of France, and Dauphin during his father's reign. He retired from France with his father at the commencement of the Revolution, and spent some time in military studies at Turin. In Aug., 1792, he entered Germany at the head of a body of French emigrants; but his ill success and unfitness for military command led to his retirement, with his father, at Edinburgh. Till 1814 he continued an exile from France, wandering from one place to another on the continent, and latterly resident with the other members of his family in England. On the entrance of the allies into France, he appeared at the British headquarters at St. Jean de Luz, and thence issued a proclamation to the French army. He entered Bordeaux under protection of the British, March 12, and made liberal promises in the name of his uncle, Louis XVIII., among which was that of complete religious liberty. He was again in the s. when Napoleon returned from Elba. He was appointed lieut.gen. of the kingdom, and hastened with such forces as he could collect to oppose the emperor; but although he obtained some advantages at first, he was soon deserted by his troops, was for some days detained a prisoner, and at last sent away in a Swedish merchant vessel to Barcelona. After the second restoration, he was sent by Louis XVIII. to the s. provinces to suppress the political and religious movements there; and in 1823 he led the French army into Spain, to put an end to the constitution. A man of phlegmatic disposition and mean abilities, he was, in all political matters, a tool of the ultra-royalists and the priests. When the Revolution took place in July, 1830, he signed, with his father, an abdication in favor of his nephew, the Duc de Bordeaux; and when the Chambers declared the family of Charles X. to have forfeited the throne, he accompanied him into exile to Holyrood, to Prague, and to Görz, where he died. In 1799 he had married his cousin, Louis XVI.'s daughter, Marie Thérèse Charlotte (1778-1851).

## ANGRA—ANGUISH.

**ANGRA**, *âng'grá*: cap. of the Azores; a seaport beautifully situated at the head of a deep bay on the s. coast of the island of Terceira (q.v.). It is a station for ships between Portugal and Brazil and the East Indies; but the harbor, though the best in the island, is very much exposed. It is the seat of the Portuguese gov.gen. of the Azores, and of the bishop; is well built, with broad streets, but dirty; strongly fortified, and protected by a citadel, and contains a military college and arsenal, a cathedral, etc. There is a considerable export of wine, cheese, honey, and flax. A. was the asylum of the Portuguese regency, 1830-33. Pop. (1890) 11,281; (1900) 10,843.

**ANGRA-PEQUEÑA**, or **PEQUENHA**, *âng-grá-pā-kān'yá*: a bay on the s.w. coast of Africa; lat. 26° 27' s., long. 15° e. It gives name to the southern littoral of Great Namaqualand (q.v.), extending 200 m. from lat. 26° s. to the Orange river, or Cape Colony, and reaching 90 m. inland—a sandy, waterless region, but rich apparently in metals, and with a healthful climate. In 1883, A.-P. was ceded by a Namaqua chieftain to Lüderitz, a Bremen merchant; and next year it was taken under German protection, with all the coast to the n. as far as Cape Frio, except Walvisch Bay, which belongs to England. The chief settlement is **ANGRA PEQUEÑA**, which has a good harbor.

**ANGRI**, *ân'grê*: town of s. Italy, province of Salerno, 17 m. n.w. from Salerno, not far from the Naples and Nocera railway. The surrounding country abounds in vineyards and cotton plantations. Pop. 6,920.

**ANGSTRÖM**, **ANDERS JONAS**: 1814, Aug. 13—1874, June 21: Swedish natural philosopher; in 1833 entered the Univ. of Upsala, where he became a *privat-docent* (1839), keeper of the observatory (1843), and prof. of physics (1858). Among his works were *Recherches sur le Spectre solaire* (1869), *Sur les Spectres des Gas simples* (1871), and *Mémoire sur la Temperature de la Terre* (1871).

**ANGUILLA**: see **EEL**.

**ANGUILLA**, *äng'ghĩ'lĩ*, or **LITTLE SNAKE**: English West India Island, one of the Lesser Antilles; 160 m. almost due e. of the e. extremity of Puerto Rico; 35 sq. m. It is low and wooded: but its clear spots produce cotton, tobacco, and sugar. Pop. (1891) 3,699.

**ANGUILLIFORM**, a. *äng-gwĩl'li-fawrm* [L. *anguil'la*, an eel; *forma*, shape]: formed like an eel or serpent.

**ANGUINEAL**, a. *äng-gwĩn'ě-ăl* [L. *anguĩnēūs*, snake-like—from *anguis*, a snake]: of or like a snake. **ANGUINE**, a. *äng'gwĩn*, snake-like.

**ANGUIS**: see **BLIND-WORM**.

**ANGUISH**, n. *äng'gwĩsh* [OF. *anguisse*; F. *angoisse*. *anguish*, pain—from L. *angus'tia*, narrowness, a strait—from L. *anguis*, a snake, referring to the writhing or twisting of the animal body when in pain—from *ango*, I draw or press tight: Sp. *angustia*; It. *angoscia*; Ger. *angst*, *anguish*]: the writhing or twisting of the body from excessive pain; intense pain of body or mind: excessive grief: V. to inflict



## ANGULAR—ANHYDRIDES.

anguish. AN'GUISHING, imp. ANGUISHED, pp. *äng'gwisht*.  
 --SYN. of 'anguish': pain; agony; suffering; pang; distress; torture; torment.

ANGULAR: see under ANGLE.

ANGUS, EARL OF: see DOUGLAS, THE FAMILY OF.

ANHALT, *än'hält*: one of the oldest principalities of Germany; now a state of the Germanic empire; on the Elbe, the Mulde, and the Saale; 896 sq. m. It consisted formerly of three duchies—A.-Dessau, A.-Bernburg, and A.-Köthen. A. is almost entirely surrounded by the Prussian territories, which intermix with it and divide it into portions. Dessau, Zerst, Bernburg, and Köthen are the principal towns. The country is level and fertile, producing wheat, flax, rape-seed, hops, and tobacco. Wine is produced on the Saale. Agriculture is the chief employment of the people, who are generally Protestants. Part of the former duchy of A.-Bernburg approaching the Harz Mountains has mineral wealth in iron and other mines. A. began to be an independent principality in the first half of the 13th c. It has been repeatedly, in the course of its history, divided among branches of the reigning family. The division into three duchies dates from the beginning of the 17th c. It was divided originally into four parts, but the line of A.-Zerst has become extinct. The three duchies were independent of each other; but a family compact connected the reigning lines, which often led them to take public action conjointly. Some of the princes of A. have been eminent in the political, military, and ecclesiastical history of Germany. Pop. (1890) 271,963; (1900) 316,085.

ANHELATION, n. *än'hē-lā'shŭn* [L. *anhēlatiō'nem*, a difficulty of breathing—from *anhēlo*, I breathe with difficulty—from Gr. *ana*, up; L. *hālo*, I breathe]: state of being out of breath; a panting.

ANHYDRIDES, *än hī drīdz*: term now commonly given to the compounds formerly known as anhydrous acids, which was a very unsatisfactory name, as these bodies do not present any of the ordinary properties of acids. In some cases they are the result of the dehydration of acids, and in all cases they represent in their composition the acid *minus* water. In the following equation is given an example of the formation of an anhydride:



The A. of the monobasic acids are formed in various ways; thus, hypochlorous anhydride is formed by the action of chlorine on oxide of mercury; nitric anhydride is formed by the action of chlorine on nitrate of silver, etc. By the action of ammonia, the A. of monobasic acids are converted into amides; thus benzoic anhydride ( $\text{C}_{14}\text{H}_5\text{O}_3$ ) + ammonia ( $\text{NH}_3$ ) = benzamide ( $\text{C}_{14}\text{H}_7\text{NO}_2$ ) + water ( $\text{HO}$ ). The A. of tribasic acid are often formed by mere action of heat on the acids, as is the case with lactic and tartaric acids.

The A. present no uniformity of appearance; for example, carbonic anhydride (commonly known as carbonic acid,

## ANHYDRITE—ANI.

which in reality is  $\text{CO}_2$ ,  $\text{H}_2\text{O}$ ) is a gas. phosphoric anhydride is a white powder, nitric anhydride occurs in crystals, sulphuric anhydride is a ductile wax like substance, while the A. of the organic acids are oily bodies heavier than water.

The most important property of this class is their conversion into the corresponding acids, under the influence of water.

ANHYDRITE, *ăn-hi'drit*: a mineral, calcium sulphate ( $\text{CaSO}_4$ ), with some slight addition of sodium chloride. It appears in several varieties, as 1. Granular, found in concretions with a foliated structure. 2. Fibrous, easily broken with a fracture in delicate parallel fibres. 3. Radiated, translucent. 4. Sparry, or Cube Spar. 5. Compact, of various shades, white, blue, gray, red. A. is converted into gypsum by combination with a certain proportion of water, and, where it is found in large masses, as on the s. of the Harz Mountains, near Osterode, the surface consists of gypsum. For building, A. has no great value, on account of its tendency to this change; but some of its varieties, especially the Siliciferous or Vulpinite, found at Vulpino, in Upper Italy, are used for sculptures, and take a fine polish. When burned and reduced to powder it is used as a manure, resembling gypsum in its effects.

ANHYDROUS, a. *ăn-hi'drŭs* [Gr. *an*, without; *hudor*, water]: term applied to a chemical substance free from water. Thus, ordinary lime-shell as it comes from the kiln is simply lime ( $\text{CaO}$ ) without any water, and is called *anhydrous* lime; but when water is thrown upon the lime-shell, the liquid disappears by combination with the lime, which very much increases in volume and becomes *hydrated* lime ( $\text{CaOH}_2\text{O}$ ). Again, ordinary stucco, before being used by the modeller, contains only lime and sulphuric acid ( $\text{CaSO}_4$ ), with no water, and is therefore A., but when water is added, and the stucco sets into its mold, it combines the two equivalents of water, and becomes hydrated stucco ( $\text{CaSO}_4$ ,  $2\text{H}_2\text{O}$ .) Examples of A. substances are also found among liquids: thus, alcohol free from water is called A. alcohol, and in like manner with A. acetic acid, A. nitric acid, etc.

ANI, *ă'nē* [Brazilian name]: bird, native of warmer parts of America; genus *Crotophaga*, family *Cuculidæ*. Two species of the genus *Crotophaga* are found in the United States; viz., the Black A. (*Crotophaga ani*), known in the W. Indies as Black Witch, and Savanna Black bird, and *Crotophaga sulcirostris* (groove-billed ani). The Black Ani is about 12 inches long, entirely black in plumage, with steel-blue, violet, and bronze reflections. it occurs in Florida and thence southward. *C. sulcirostris* gets its specific name from the three grooves on its bill parallel with the curved culmen: it inhabits tropical America and northward as far as Texas.

ANI. ruined city of Turkish Armenia, about 25 m. s.e. of Kars; in the 10th c., cap. of the Armenian Bagratide Kings. After being repeatedly captured and plundered during the next 400 years, it was finally destroyed by earthquake.



## ANICET BOURGEOIS—ANILINE.

ANICET BOURGEOIS, *ā-nē-sa-bōrzh-waw'*, AUGUSTE: 1806-71 French dramatist.

ANICHINI, *ā-nē kē'nē*, LUIGI: engraver of seals and medals. b. Ferrara, lived at Venice about 1550, Michelangelo deemed him perfect in his art.

ANIELLO, TOMMASO: see MASANIELLO.

ANIGHT, ad. *ā nīt'*, or ANIGHTS, ad. *ā-nīts'* [AS. *a*, on or in, and *night*]. in the night-time; nightly.

ANIL: see under ANILINE.

ANILE, a. *ān'īl* [L. *anilis*—from *ānus*, an old woman]: pertaining to an old woman; aged; imbecile. ANILITY, n. *ān-īl' tī*, old-womanishness; dotage.

ANILINE, n. *ān'ī-līn* [Ar. *annil* or *al-nīl*, the indigo plant]: a substance obtained from indigo, and certain other organic substances—used in the preparation of mauve and magenta dyes, for which it is obtained from *benzole*, one of the constituents of coal-tar. ANIL, n. *ān'īl*, one of the plants yielding indigo.

ANILINE, or AMIDO-BENZENE, or PHENYLAMINE:  $C_6H_7N = C_6H_5.NH_2$ : colorless oily liquid, with faint peculiar odor, sp. gr. 1.036 at 32° F., boiling point 366.5° F. When quite pure, A. solidifies at low temperatures; it melts at 20° F. In water it melts sparingly (in 31 parts at 54.2° F.), but in alcohol and ether easily. When exposed to the air, A. turns brown and gradually resinizes. The aqueous solution, mixed with calcium chloride, assumes a violet color. The solution in strong sulphuric acid, on addition of a few drops of aqueous potassium dichromate, turns first red, then deep blue: pine shavings dipped in A. take a yellow color. A. is a strong *base* (q.v.), producing numerous crystalline salts, though it has no alkaline action on vegetable colors. Physiologically, it is a strong narcotic poison, its fumes producing giddiness and then insensibility (the body becoming of a leaden blue color); taken internally it causes death. Inhalation of its fumes by workmen engaged in its manufacture produces symptoms of poisoning, as neuralgia, giddiness, nausea, insensibility, etc.; articles of attire dyed with A., as stockings, sometimes cause a peculiar cutaneous eruption. The sulphate of A. has been used in med. in the treatment of nervous disorders, as chorea.

A. was discovered 1826 by Unverdorben, who obtained it by the dry distillation of indigo (Port. *anil*, hence the name). But all the A. now manufactured comes from coal-tar. When coal is heated in the manufacture of illuminating gas, a large number of substances are produced, and are obtained as a tarry matter of varying composition. Only a few of these bodies are of commercial importance, the chief being ammonia, carbolic acid, anthracene, naphthalene, pitch, and benzene. It is this last-named substance that yields aniline. If it is treated with strong nitric acid, an intermediate compound, nitro-benzene,  $C_6H_5NO_2$ , is formed, which, when mixed with acetic acid and iron-filings, yields acetate of aniline. A. may be prepared also by passing a mixture of benzene and ammonia through a

## ANILINE.

red-hot tube, after the following reaction:



The *A. dyes* consist of various bases obtained by oxidation of A. by means of nitric acid, chlorine, arsenic, and other agents: the bases themselves may be quite colorless, but the tints are developed when the salts are formed. The A. dyes may be regarded as *amines*, i.e., ammonia compounds with one or more radicals replacing as many atoms of hydrogen. Thus in diphenylamine,  $\text{NH}(\text{C}_6\text{H}_5)_2$ , 2 equivalents of H in  $\text{NH}_3$  (ammonia) are replaced by 2 equivalents of the radical  $\text{C}_6\text{H}_5\cdot$ ; there is a like substitution in dimethyl A.,  $\text{N}(\text{C}_6\text{H}_5)(\text{CH}_3)_2$ , and in methyl A.,  $\text{N}(\text{C}_6\text{H}_5)(\text{CH}_3)_2$ , in both of which the radicals displace the 3 hydrogen equivalents; and so on. As the A. dyes number several hundred, only the leading varieties can be indicated here. *A. purple*, or *mauve* was the first of the coal-tar colors discovered (by Perkins 1856). It is a powerful violet dye, and is prepared by mixing solutions of A. sulphate and potassium bichromate in equivalent proportions, and allowing the mixture to stand several hours. The black precipitate formed is filtered off and purified from admixed potassium sulphate by washing with water, then dried and freed from resinous matter by repeated digestion with coal-tar naphtha, and finally dissolved in boiling alcohol. For further purification the alcoholic solution is evaporated to dryness, the substance is dissolved in a large quantity of boiling water, reprecipitated with caustic soda, washed with water, dissolved in alcohol, acidified in acetic acid; the filtered solution is evaporated to dryness or crystallized. Mauve so prepared is a brittle substance with beautiful bronze-colored surface; scantily soluble in cold water, though it gives to the water a deep purple color; more soluble in hot water, very soluble in alcohol, nearly insoluble in ether and hydrocarbons, but it dissolves in concentrated acetic acid, from which it crystallizes. The most important of the *A. greens* are 'aldehyde green' and 'iodine green.' *Aldehyde green* is produced by adding  $1\frac{1}{2}$  parts aldehyde to a cold solution of magenta (q. v.) in a mixture of 3 parts strong sulphuric acid and one part water. Then the mixture is heated in a water-bath till a drop of it diffused in water produces a fine blue color, then it is poured into a boiling solution of sodium thiosulphate. The liquid is then boiled and filtered; from the filtrate the green may be precipitated by tannin: it is used chiefly in silk dyeing. *Iodine green*, produced by heating the violets of triethyl-rosaniline or trimethyl-rosaniline with iodide of methyl, ethyl, or amyl, is much used in dyeing cotton and silk.

The A. dyes are noted for intense coloring power, one part of a rosaniline salt in a million parts of water still possessing a deep crimson color, and instantly dyeing a skein of silk moistened with vinegar. Even in so dilute a solution as one grain dissolved in 1,500 gallons of water, it is capable of dyeing a silk thread immersed in it for 24 hours.

Many of the dyes exhibit complementary colors (see **LIGHT**) when looked at by reflected and transmitted light;



thus, the strong solution of the salt above referred to appears a purple red by transmitted, and a brilliant green by reflected, light, a fact familiar to the users of an A. red ink, or an ink for any of the familiar 'graph' copying processes. Here the pen assumes a green shining appearance, quite different from the color of the ink. A. dyes are used as lacquers for cheap toys, being readily soluble in spirit varnish—the well known 'bronzing liquid' being an example of this. Mixed with gelatin or collodion, and allowed to dry in thin sheets, they furnish the thin transparencies much used for producing stained glass imitations. They have been used also for coloring wines and sweetmeats, but as arsenic was formerly or is still employed in manufacture of the red varieties, this practice is attended with risk. The use of arsenic has of late been largely abandoned; or, when used, makers take care to eliminate the arsenic at the end of the process, so that the final product is innocuous. The readiness with which any housewife can dye articles of clothing or household ornaments has made these dyes great favorites. The chief drawback lies in the fugitive nature of many varieties, but notwithstanding, there is a wide field still open to them. The A. colors are as a whole disapproved from the artistic point of view. Some are specially objectionable when used in the same textile fabric with natural dyes. Notwithstanding this, the introduction of A. dyes is said to have closed half the dyers' shops in India. A few years ago the shah of Persia prohibited the importation of these colors into that country. For further details about dyes see DYE-STUFFS. Although England and France were first in the field, Germany took up the manufacture with so much zeal and scientific skill, that it soon surpassed its competitors, producing superior shades of color. Germany is now the headquarters of the industry, its products being of the highest class and the lowest price. The product in Germany is estimated to be a third greater than that in France, and three times that in England; while the annual value of English A. colors may amount to a million and a half pounds. See Perkin, *On the Coal-tar Colors in Nature*, xxxii.; and *The Chemistry of the Coal-tar Colors*, by Benedikt (Eng. trans. 1886). ANILINE OIL is a by-product in the manufacture of A.: it contains sundry organic bases of the aromatic series, as aniline, toluidine, etc. It is employed as a solvent of rubber, copal, and various other substances. ANILINE PENCIL, a pencil formed of a mixture of aniline, graphite, and kaolin; used in copying and in transferring writing or designs.

ANIMA, *ăn' ē-mâ* [L.]: the soul; vital principle. ANIMA BRUTORUM, the soul of brutes; principle of brute life and intelligence. ANIMA HUMANA, man's soul or principle of life and intelligence. ANIMA MUNDI (see that title).

ANIMA, CON, *kõn ăn' i-mă*, in Music: with animation, in a spirited manner.

ANIMADVERT, *v. ăn' i-măd-vért'* [L. *anĩmădver' tērě*, to direct the thoughts or attention to—from *anĩmus*, the mind; *ad*, to; *verto*, I turn]: to turn the mind to; to consider; to remark upon. ANIMADVERT'ING, imp. AN'IMAD-

## ANIMAL

VERT'ED, pp. AN'IMADVERT'ER, n. one who. AN'IMAD-  
VER'SION, n. -vēr'shŭn [L. *anīm'adversīō'nem*, investigation  
—from *versus*, turned]: the act of turning the mind to; re-  
proof; censure.—SYN. of 'animadvert': to remark; criticise;  
comment; blame; censure; condemn; reprove; reproach;  
upbraid; reprimand; rebuke; chide.

ANIMAL, n. ān'ī-māl [L. *animal*, a living creature]: a  
body possessed of life, sensation, and power of motion:  
ADJ. pertaining to a living creature; gross; opposite of  
spiritual. ANIMALIZE, v. ān'ī-māl-īz', to make like an  
animal; to give animal life to. AN'IMALIZING, imp. AN'-  
IMALIZED', pp. -īz'd', converted into animal matter. AN-  
IMALIZATION, n. ān'ī-māl'ī-zā'shŭn, the act of endowing  
with life. AN'IMALISM, n. -īzm, sensual indulgence; mere  
life without intellectual activity. AN'IMALITY, n. -ī-tī,  
state of animal existence. ANIMAL KINGDOM, one of the  
three great departments of natural objects; comprising all  
living creatures,—the others being the *vegetable* and *mineral*.

ANIMAL and ANIMAL KINGDOM: one of the supposed  
three great departments of natural objects. The popular  
classification of all bodies into three kingdoms—the animal,  
the vegetable, and the mineral—has assumed authority only  
in recent times, and has done much mischief in exaggerating  
the apparent differences between plants and animals on the  
one hand, and in obscuring the fundamental distinction  
between these and minerals on the other. There are in  
reality only two kingdoms of nature, the living and the non-  
living—the organic and the inorganic. The famous apho-  
rism of Linnæus, 'Stones grow; plants grow and live;  
animals grow, live, and feel,' is no longer satisfactory, for  
growth is of two distinct kinds. While growth in minerals  
takes place merely by *accretion*—addition of new particles  
to the external surface, that of living matter is by *intussus-  
ception*—the interposition of new molecules between those  
formerly present. Again, living matter, or *protoplasm*, is  
clearly distinguished by its chemical composition, it being  
composed of very highly complex compounds, or mixture of  
compounds of carbon, nitrogen, hydrogen, oxygen, and  
sulphur, together with water and salts. During life it is in-  
cessantly *disintegrating* and combining with the oxygen of  
the atmosphere, many products of change (chief among  
which is carbonic acid) being evolved; and *reintegration*  
must therefore take place by intussusception, for which  
purpose new matter containing the necessary elements must  
be taken up, either from other organisms, or from the in-  
organic world. Certain *cyclical changes* are also exhibited  
by all forms of living matter—that is to say, each arises as  
a detached portion of some previous organism; develops  
into a similar form to that from which it arose; tends to re-  
produce itself; and, finally, ceasing to live, its protoplasm  
breaks up, and its elements ultimately return in a highly  
oxidized state to the inorganic world. Finally, certain  
conditions of temperature, pressure, presence of oxygen,  
etc., variable only within comparatively slender limits, are  
essential to the maintenance of life.



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While living bodies are thus clearly distinguishable from inorganic, every attempt to erect a similarly sharp distinction between plants and animals completely breaks down. Vast numbers of animals are destitute of the power of locomotion, so that, for instance, corals were unhesitatingly referred to the vegetable kingdom until about a century ago; while diatoms, and many embryonic algæ and fungi, which possess marked powers of locomotion, would thus require to be ranked as animals. Nor is sensibility a purely animal characteristic; the well-known sensitive plant, the sun-dew and Venus fly-trap, exhibiting it in the most marked degree. Cellulose, again, which forms the coating of the vegetable cell, was regarded as completely characteristic of this; but many algæ and fungi are naked at some period of their lives, while the thick external tunic of those degraded vertebrates known as Aseidians has the chemical composition of plant cellulose. Chlorophyll, the green coloring matter of plants, is absent from fungi and from many flowering parasites, and is yet present in infusorians, in Hydra, and some other invertebrates, which are thus enabled to vegetate in sunshine, forming starch and evolving oxygen. Animals thus do not necessarily feed; while the well-known insectivorous plants (see DIONÆA, SUN-DEW) capture animals, and frequently digest them.

The attempt to establish a difference in structure is equally unsuccessful; for although the students of higher forms have no difficulty in grouping their flowers and ferns, their birds and beasts, into distinct series, the microscopist finds that these two great stems arise from a common root. It has therefore repeatedly been proposed to divide living forms into three groups—Animals, Plants, and *Protista*—a solution which, however, raises two new difficulties—that of distinguishing on the one hand between Protists and Animals, and on the other, between Protists and Plants. And thus every attempt to limit and define its forms has really resulted in proving the fundamental unity of life.

It may, however, be noted regarding animals that they are distinguished from vegetables by the fact that most animals give more or less indications of mind: in those high in the scale, this mental life rises to a degree capable of cultivation, while in the lower classes it appears as instinct confined to a few operations; and some of the lowest animals have a mental possession so small that it seems scarcely equal to what may be called the vegetative instinct in some exceptional classes of plants. For communicating with the outer world, vertebrated animals are provided with a nervous system in connection with a central brain—a *cerebral* nervous system; the *ganglionic* nervous system of the lower animals seems to serve this purpose less and less as we descend in the scale. The impressions from without are received immediately by the organs of sense, which become more numerous and complex the higher the animal stands in the scale: among the higher animals, five senses are usually distinguished, which are variously developed—in none so harmoniously and for such high uses as in man.

The general study of the *forms* of life constitutes the

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science of Biology, of which the sub-sciences are: (1) Morphology, dealing with the structure of organisms, and including Anatomy and Embryology; (2) Distribution, dealing with the time and place of their occurrence on the earth; (3) Physiology, dealing with the study of their functions; (4) *Ætiology*, dealing with the explanation of the preceding facts by the rival hypotheses of Creation and Evolution. These subjects are divided between botanist and zoölogist, and their labors, while starting, as has been shown, from a common point, thence diverge widely. The results of Animal Morphology are outlined under ZOOLOGY, VERTEBRATA, etc.; for Animal Physiology, see the separate functions, DIGESTION: REPRODUCTION: NUTRITION, etc.; see also GEOGRAPHICAL DISTRIBUTION: EVOLUTION, etc.

ANIMAL CHEMISTRY, or PHYSIOLOGICAL CHEMISTRY: the department of chemical science dealing with investigation of the composition and properties of protoplasm and its various modifications which form the tissues and organs of living beings; and with the precise nature of the constructive and destructive changes which take place in those tissues and organs during the performance of their functions.

Protoplasm is always found to contain much albuminous or proteid matter, together with smaller quantities of amyloids and fats, and its molecule is conjectured to include representatives of all these three classes. Much water is also present, together with small quantities of numerous products of functional activity. We may briefly refer to these.

*Proteids* (q. v.) are at present classified as follows: (1) Native Albumens (egg, serum, etc.); (2) Derived Albumens (acid and alkali albumens, casein); (3) Globulins (globulin, myosin, vitellin, etc.); (4) Fibrin; (5) Coagulated Proteids; (6) Peptones; (7) Lardaccin. Certain nitrogenous bodies allied to proteids are mucin, chondrine, gelatin, keratin, nuclein, etc., which form the principal components of mucus, cartilage-matrix, connective tissue, epidermic structures, and cell nuclei respectively.

The *Amyloids*, or carbo-hydrates, from their far less complex structure, are much better understood. The most important of these are grape-sugar (glucose, dextrose, diabetic sugar),  $C_6H_{12}O_6 + H_2O$ ; milk-sugar (lactose),  $C_{12}H_{22}O_{11} + H_2O$ ; muscle-sugar (inosite),  $C_6H_{12}O_6 + 2H_2O$ ; glycogen or animal starch,  $C_6H_{10}O_5$ ; and dextrin,  $C_6H_{10}O_5$ .

The fats, with their derivatives and allies, form very complete series, acid, neutral, and nitrogenous, of which the composition is tolerably well known. The acetic acid series ( $C_nH_{2n}O_2$ ) is best represented, including formic (in blood and many tissues, also secreted by ants, etc.); acetic (in stomach during fermentation of food, in diabetic urine, etc.); propionic (in sweat, etc.); butyric (in milk; also sweat, urine); valerianic (in fæces); caproic, caprylic, and capric (in butter); lauro-stearic and myriotic (in spermaceti, etc.); palmitic and stearic acid (in human fat). Of the oleic series,  $H(C_nH_{2n-3})O_2$ , many members are known. Human fat is a mixture of oleic, palmitic, and stearic acids in combination with glycerine. The glycolic acid series is repre-



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sented by lactic acid, the oxalic series supplying oxalic and succinic acids. Cholesterin is abundant in nervous tissue and in bile, etc. The complex nitrogenous fats are lecithin, neurin, cerebrin, etc.

The most important product of nitrogenous waste in mammalia is urea ( $(\text{NH}_2)_2\text{CO}$ ), which forms the chief solid constituent of urine, and occurs in traces in blood and most tissues, except muscle, which, however, contains intermediate products of decomposition. Little is yet known of its relations to the proteids, from which it arises; but Schützenberger has succeeded in decomposing albumen into carbonic anhydride and ammonia in the same ratio as urea, and therefore concludes that the molecule of albumen is a complex ureide. Uric acid ( $\text{C}_5\text{H}_4\text{N}_4\text{O}_3$ ) predominates in the urine of birds and reptiles, but it is also present in small quantities in that of mammals, and its salts form gouty and urinary concretions. Kreatin, kreatinin, and sarkin occur constantly in muscle; xanthin, guanin, etc., in urine; glycocoll and taurin, in combination in the bile acids, etc.; leucin and tyrosin, as products of pancreatic digestion.

Most of the preceding substances, though seldom constant, appear to be of exceedingly wide distribution throughout the animal kingdom. A few substances, including several of the more important proteids, grape-sugar, muscle-sugar, peptic and diastatic ferments, are also of frequent occurrence in the vegetable kingdom; while some of the most important and characteristic vegetable compounds also occur incidentally among animals, e.g., cellulose, chlorophyll, and starch. The whole progress of research tends to show the fundamental unity not only of the composition of animal and vegetable protoplasm, but also of most of the processes of waste and repair in animals and plants alike. Thus, for instance, it has very recently been proved by analysis that allantoin, a body analogous to urea, and known as an important waste product of the vertebrate embryo, is also found in quantity in opening buds in spring.

See BLOOD: BONE: MUSCLE, etc.; also DIGESTION: NUTRITION: RESPIRATION: etc.; also FAT: UREA: ALBUMEN: PROTEINE, etc. See Gamgee's *Physiological Chemistry*, and Foster's *Text-book of Physiology*.

ANIMALCULE, n. *ăn'î-măl'kûl* [L. *animal'culum*]: a creature very small or very minute, generally invisible to the naked eye—plu. AN'IMAL'CU**L**A, also AN'IMAL'CU**L**ES, -*kûlz*. AN'IMAL'CU**L**AR, a. -*lêr*, or AN'IMAL'CU**L**INE, a. -*lîn*, pertaining to; somewhat resembling animalcules.

ANIMALCULE: a term which, although etymologically applicable to any very small animal, is limited in ordinary language to those which are microscopical. Animalcules exist in prodigious numbers, their size being such that myriads of them find ample space for all the movements of an active life within a single drop of water. Sea-water often contains them in enormous numbers, and the luminosity of the sea is often due to this cause (*Noctiluca*). Although, contrary to a widely-diffused belief, they occur only in very small number in drinkable waters, they abound wherever

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water becomes stagnant, or contains decomposable organic matter. Thus rain-water allowed to stand long in an open cistern, or the water of a vase in which cut flowers are placed, soon becomes more or less turbid and offensive; and if a drop be placed on a slip of glass and examined, even with a pocket lens, a multitude of living beings can be seen moving rapidly in all directions, while minute specks are also to be seen in motion between these. On the application of higher microscopic power, new organisms come again into view, so that the variations of size between the invisible inhabitants of one drop are as great as those between whales and minnows. An immense variety of animalcules can very easily be studied by collecting impure water from a dozen different sources, and keeping it separate in open wide-mouthed bottles in a window, and observing from time to time, for not only do the contents of the different vessels differ from each other, but they also vary greatly with the season, so that an unending series of surprises is open to the most inexperienced microscopist without his leaving his room. Besides numerous varieties of microscopic algæ, diatoms, bacteria, etc. (see ALGÆ: DIATOMACEÆ: PROTO-PHYTES), examples of all the leading forms of minute animal life are thus to be obtained; and these, at first supposed to belong to the same general type of structure, are now known to be extremely varied. The simplest form with which the observer will meet is a naked lump of jelly-like protoplasm, constantly flowing into new shapes, the *Amœba* (see PROTEUS); while other masses of jelly, the Foraminifera, may be found possessed of coverings of sand, or even carbonate of lime, and only protruding their irregular processes (pseudopodia) through its openings. Others, again, the sun-animalcules of fresh water, and the Radiolarians, which inhabit the sea, are usually possessed of a beautifully marked flinty skeleton. These groups are usually united under the head of *Rhizopoda* (q.v.). Another great series, in which the form of the body is usually definite, the pseudopodia being generally replaced by vibratile threads or cilia, are termed the *Infusoria*. All these are the equivalents only of a single cell of higher animals, and are therefore grouped into the sub-kingdom Protozoa; but many animalcules are of far more complex organization. Thus the wheel animalcules (see ROTIFERA) are segmented, worm-like animals; and the larvæ of almost all marine and fresh-water invertebrates are at an early stage free-swimming and microscopic. From its extreme vagueness, therefore, the term A. is now disused by scientific writers.

Despite their apparent insignificance, certain animalcules, by virtue of their almost imperishable skeletons, are among the most important agencies which have built up the crust of the earth. The surface of the sea is largely inhabited by Radiolarians and Foraminifera, the former preponderating in cold, the latter in temperate and tropical, waters. As they die, their skeletons sink to the bottom, and form mud or ooze, which through time and pressure becomes consolidated into rock. Many polishing stones, etc., are thus mainly composed of Radiolaria; while chalk is principally



## ANIMAL FLOWER—ANIMAL HEAT

formed by the skeletons of Foraminifera, and greensand of internal siliceous casts of these. Many limestones, marbles, quartzites, etc., are probably of similar origin, although all trace of organic structure may have been eliminated by metamorphic change. See Carpenter *On the Microscope*, and the *Micrographic Dictionary*.

**ANIMAL FLOWER:** see ACTINIA: ANEMONE, SEA.

**ANIMAL HEAT:** heat whose evolution accompanies the constant processes of the disintegration and oxidation of living protoplasm. The greater the activity of change, the higher does the temperature tend to become. Not only, therefore, are the so-called cold-blooded animals really warmer than the surrounding atmosphere, but even plants recognizably evolve heat, and the temperature of certain flowers, where protoplasmic activity is highest, may sometimes almost reach that of the human body. See ARUM.

Even the infusoria evolve heat, as is shown by the slowness with which the surrounding water freezes. John Hunter showed that worms and leeches, slugs and snails, were all one or two degrees warmer than the air. Fishes generally are only two or three degrees warmer than the water they inhabit; but in some of the more active, like the bonito and tunny, a temperature of 99° F. has been observed, while the surrounding water was at 80½°. So, too, the frog, which usually averages about 1° warmer than the air, is 2° or 3° warmer while breeding; while in certain lizards and snakes, a difference of as much as 15° to 20° F. has been recorded. Newport's researches on insects show that while the temperature of the larva may vary from ½° to 4° above that of the atmosphere, that of the pupa is almost imperceptibly higher, and that of the perfect insect may rise enormously; a difference of from 2° or 3° at rest, to from 9° to 20° in excitement, having been observed in individual bees, and a much more marked elevation in the temperature of the whole hive, which has been observed to reach 102° F. Among the animals commonly termed warm-blooded, the temperature, although generally higher in birds than in mammals, varies from species to species, yet is very nearly constant during health in each. Thus, while the average temperature of the human body is about 98.4° F., that of the wolf is 3° or 4° lower, and that of the Arctic fox 5° or 6° higher. In birds, the temperature varies from 100° in the gull and other aquatic birds, to nearly 112° in the swallow, while, on the other hand, a hibernating mammal like the lemming becomes temporarily cold-blooded, its temperature during the winter sleep being comparatively little above that of the atmosphere.

From the preceding details, it is evident that while cold-blooded and warm-blooded animals thoroughly agree in evolving considerable amounts of heat, the difference between them lies in this, that in the former the means of loss of heat by the skin, etc., are great as compared with the normal production of heat, while in the latter the loss and production of heat are kept balanced.

Physiologically considered, the animal body is a machine

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for converting the potential energy supplied by food, into the actual energy of heat and mechanical work. Knowing the quantity and chemical composition of the food, it is easy to calculate the amount of energy furnished to the body. The average income of energy of the human body on normal diet is about 1,000,000 metre-kilogrammes, of which about 150,000 units can be expended in muscular work, the remaining 850,000 leaving the body in the form of heat. As to the channels by which heat leaves the body, Helmholtz has calculated that fully  $2\frac{1}{2}$  per cent. leaves the body with the fluid and solid egesta, about  $5\frac{1}{4}$  per cent. is spent in warming the expired air, about  $14\frac{3}{4}$  in evaporating the water expired by the lungs, and the balance, about  $77\frac{1}{2}$  per cent., by the skin, in conduction, radiation, and evaporation.

These general considerations once grasped, the apparent anomalies and variations in the temperature of different animals present no difficulty. See TEMPERATURE OF THE BODY, etc.: also any Manual of Physiology.

ANIMAL MAGNETISM, or MESMERISM: see HYPNOTISM.

ANIMALS, CRUELTY TO: an offense against law in civilized countries. The United States has by act of congress, 1873, March 3, taken cognizance of the treatment of animals during inter-state transportation; the act providing that in cases of such transportation, whether by railroad or by steam, sailing, or other vessels carrying or transporting cattle, sheep, swine, or other animals, from one state to another, such animals shall not be confined for a longer period than twenty-four hours, without unloading for rest, water, and feeding, for a period of at least five consecutive hours, unless prevented by storm or other accidental causes. For every failure of compliance with this law, provision is made for a penalty of not less than \$100 and not more than \$500. The law does not, however, apply to cases where the animals are carried in cars, boats, or other conveyances in which they have proper food, water, space, and opportunity to rest. The penal laws against cruelty to animals which have been passed by the legislatures of the different states have generally the same or similar provisions and penalties. The offenses stated include overdriving, overloading, brutal punishment, torturing, failure to provide proper sustenance, abandonment of any disabled animal; carrying or transporting in a cruel manner; throwing upon the public highway salt, nails, pieces of glass, or other substance which can wound or injure animals; poisoning or attempting to poison; keeping milch cows in unhealthy places, and feeding them with food producing unwholesome milk; starting fights between birds or animals, and running horses on the highway. The offense in all these cases is a misdemeanor, punishable by either fine or imprisonment, or by both.—The American Soc. for the Prevention of Cruelty to Animals was founded in New York, 1886. Under the direction of Mr. Henry Bergh, its president, whose name has become everywhere identified with the movement, this organization has been the means of spreading in all directions the sentiments and



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the laws of mercy to the brute creation. This society is charged with the duty of enforcing these laws, and is endowed with extraordinary powers for the purpose. Its field now practically covers the whole country, as it has branches in all the principal cities and large towns in the United States. The English Soc. for the Prevention of Cruelty to Animals, founded 1824, has become very strong and active; the Scottish Soc., founded 1839, differs slightly in its mode of prosecution.

ANIMALS, WORSHIP OF: a religious practice, characteristic of many of the less cultured races, which has sometimes held its place in the higher stages of civilization. Its origin may be ascribed to Animism (q.v.), or a doctrine of souls and other spiritual existences, having the widest prevalence through all earlier and much recent history. Among primitive peoples, all animals are supposed to be endowed with souls, which in many cases have formerly animated human beings. Hence a likeness is often recognized between an animal and some deceased friend, and the animal is addressed as the person would have been, and honored with a kind of worship. The case of an ancestral soul, worshipped as incarnate in an animal body, thus forms a link between ancestor-worship and beast-worship; and this connection otherwise appears in the veneration of a particular species of animal by a particular family, clan, or tribe. Many tribes call themselves by the name of, and even derive their pedigree from, some animal. Its cries become the omens of the tribe, and thus originate the divination and augury of more civilized nations. This curious and widespread belief in a descent from animals in connection with a belief in transmigration into other forms, goes far to explain such phenomena as lycanthropy (see WERE-WOLF) and the unions between animals and human beings so common in folk-lore, and has doubtless originated in totemism (see TOTEM). The division of a tribe into the families of the bear, crane, turtle, etc., probably indicates a time when families claiming descent from ancestors holding those names, have banded themselves together for the common interest; and that an ancestor should be called the bear, or turtle, or crane, indicates a time still further back, when the name was given him for some reason. Many ethnologists, notably Sir John Lubbock and Herbert Spencer, suppose these names to have been originally personal epithets, designating qualities or characteristics of the individual (thus, a slow man would be called a turtle, a very long-legged man a crane), which became family surnames, and eventually gave rise to myths of the families being actually descended from the animals in question as ancestors; while popular mystification between the great ancestor and the creature whose name he held and handed down to his race, led to veneration for the creature itself, and thence to full animal worship. Though such nicknaming as this undoubtedly has occurred, totemism must have had a much broader and deeper foundation. Perhaps the best explanation is that suggested by the worship of personal deities, seen in its greatest development in the N. Amer. native races. The *manitou* of the Indian is

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almost always an animal, and is chosen by each individual at his coming of age, being pointed out to him in a dream, produced by the greatest religious act of his life—his first fast. This animal then becomes an object of worship, and its skin is carried about the person as a fetich, and its likeness painted on the body, or sculptured on the weapons. Thus arise tattooing and heraldry—forms of worship—and the superstitious fear that the savage entertains of killing or eating his manitou, or patron animal. The manitou develops into the totem, or sacred animal, of the gens or family which descends from that person, and worship is paid to all representatives of its species. Equally strong evidence is obtained from the ancient nations. Some facts are preserved in the signs of the Zodiac, the majority of which are animals, and compounds of human and animal forms. There is nothing in the grouping of the stars to suggest animal forms, and the probability is, that in ancient as in modern times, stars, when named, were given names of distinction that commanded respect, if not veneration; therefore that the animals whose names were transferred to stars were, on earth, highly, if not religiously, venerated. This is borne out by the legends of the transference of particular animals to the heavens. The frequency also, of animal-names, and of representations of the same animals upon coins, points to the same conclusion. In the old Egyptian animal worship, also, the theory of tribe-fetiches and deified totems is borne out. Deities are found patronizing special sacred animals, incarnate in their bodies or represented in their figures; while many of the sacred creatures are worshipped in one locality, yet killed and eaten with impunity elsewhere. In the modern world, the most civilized people among whom animal worship vigorously survives lie within the range of Brahmanism. Here the sacred cow is not merely to be spared; she is, as a deity, worshipped and bowed to daily by the pious Hindu. Siva is incarnate in Hanuman, the monkey god; the divine king of birds, Garuda, is Vishnu's vehicle; and the forms of fish, and boar, and tortoise, are assumed in the avatar-legends of Vishnu, which are at the intellectual level of those Red Indian myths which they so curiously resemble. Perhaps no worship has prevailed more widely than that of the serpent. It had its place in Egypt and among the Hebrews; in Greece and Rome; among the Celts and Scandinavians in Europe; in Persia and India; in China and Thibet; in Mexico and Peru; in Africa, where it still flourishes as the state religion in Dahomey; in Java and Ceylon; among the Fijians, and elsewhere in Oceanica. And even within the limits of Christianity, we find the sect of the Ophites, who continued or renewed snake-worship, blended curiously with purer rites. It is evident, however, that although some animals may have received a preference, yet all had a share in the superstitious reverence of primitive peoples; and this broad universality of their worship militates against any other theory of its origin except that based on the theory of the transmigration of souls. See Fergusson's *Tree and Serpent Worship* (1868); McLennan in the *Fortnightly Review* for 1869 and 1870; Herbert



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Spencer in the *Fortnightly* for 1870; Dr. Tylor's *Primitive Culture* (1871); Dr. Robertson Smith in the *Journal of Philology* (1880); and Dorman's *Origin of Primitive Superstitions* (Philadelphia, 1881).

ANIMA MUNDI, *ăn'ĩ-mă măn'di* [L. literally 'the soul of the world']: the doctrine contained in this phrase was favorite with the early philosophers, who conceived that there resided in nature a force immaterial, yet not intelligential, the source of all physical and sentient life. Plato held it impossible for pure spirit—the atmosphere in which alone eternal and archetypal ideas could exist—to bear any relation whatever to matter, and he therefore supposed the latter to be operated upon by an inferior agency, the *A. M.* In the system of the Stoics, the *A. M.* was conceived to be the sole vital force of the universe; it usurped the office of pure spirit, and the doctrine became indistinguishable from Pantheism (q.v.). The notion does not seem to have been entertained by schoolmen, but it reappears in the writings of Cornelius Agrippa, Paracelsus, and Van Helmont, and, in a modified form, was held by More, Cudworth, and others.

ANIMATE, v. *ăn'ĩ-măt* [L. *animatus*, endowed with life—from *anima*, the animal life]: to give life to; to enliven; to invigorate; to inspirit: ADJ. alive; possessed of animal life. AN'IMA'TING, imp. AN'IMA'TED, pp.: ADJ. lively; vigorous. AN'IMA'TOR, n. one who. ANIMATION, n. *ăn'ĩ-mă'shŭn*, the state of being animated; possessing life or spirit. AN'IMA'TINGLY, ad. *-lĩ*, in a way to impart animation. ANIMATIVE, a. *ăn'ĩ-mă'tiv*, capable of giving life.—SYN. of 'animate, v.': to inspire; enliven; cheer; exhilarate; inspirit; stimulate; rouse; instigate; incite; prompt; urge; gladden; quicken; encourage;—of 'animation': vivacity; spirit; life; buoyancy; liveliness; airiness; sprightliness.

ANIME, n. *ăn'ĩm-ě* [Sp.]: a resin exuding from the trunk of the *Hymenæa Courbaril*, a large tree of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, a native of New Spain and Brazil. It somewhat resembles copal, but is more easily soluble in alcohol.—The name A., or Gum A., is, however, also given in Britain to a resin called in India copal, the produce of *Vatiria Indica*, a tree of the natural order *Dipteraceæ*; while the copal of Madagascar is produced by *Hymenæa verrucosa*, and that of Brazil in great part by several species of *Hymenæa*, a tree of which genus is regarded as also the probable source of the copal of Mexico.

ANIMISM, n. *ăn'ĩ-mĩzm* [L. *anima*, life, soul]: the general doctrine of souls and other spiritual beings; a sense in which it was used first by Dr. Tylor, and now generally adopted; though the term was originally used to denote the theories of Stahl (q.v.), which regarded the vital principle and the soul as identical. It is convenient to take the belief in spiritual existence as a minimum definition of religion. It appears among all low tribes with which we have any intimate acquaintance; and all travellers who have

hitherto asserted the existence of races without it have been afterwards refuted by the facts. A. may be considered to have arisen simply from the evidence of the senses, interpreted by the crude and child-like science of the savage. Two problems seem to have exercised the primitive mind. First, what is it which makes the difference between a living body and a dead one? what causes waking, sleep, disease, and death? In the second place, what are those human shapes which appear in dreams and visions? The savage makes these two groups of phenomena each help to account for the other, by combining both in the conception of an apparitional or ghost soul, which is conceived of as an insubstantial human image, resembling a vapor or a shadow. the cause of life and thought in the individual it animates, capable of leaving the body and appearing to men waking or asleep as a phantasm separate from the body of which it bears the likeness, and able to enter into, possess, and act in the bodies of other men, of animals, and even of things inanimate. When the sleeper awakens from a dream, he believes that his soul has really been away, or that the souls of others have come to him. His body has been still, but his living self or soul, his phantom or image, has been active. And have not waking men, in broad daylight, sometimes seen these human phantoms in what are called visions or hallucinations; and after a man has died and been buried, has not his phantom-figure continued to appear to the survivors in dreams and visions? And what is his reflection seen in still water, or his shadow falling behind him, or the breath seen for a moment issuing from his lips like a faint cloud, but the man's ghost-soul becoming visible for a moment and vanishing again? In the thought of the savage as of the child, personality is ascribed not to men and beasts only, but also to things. His ghosts do not come to him naked, but dressed in the well-known clothing worn in life. This is the explanation of one of the most wide spread rites of animistic religion—the offering of funeral sacrifices for the service of the dead. The phantasmal images of the objects offered pass into the possession of forms shadowy like themselves—the souls of the dead. These spiritual beings fill all nature, animate and inanimate, and in savage religion their life is a continuation, and not a new life. They transmigrate into human beings, animals, plants, and lifeless things, and they can avenge their past or present wrongs by bringing disease upon the individual. The man keeps after death the temper he had in life, and is powerful for good or evil according to his inclinations while alive. From this, and not from mere family affection, arises naturally the ancestor-worship, which has been from remote antiquity, and is still, the main faith of the larger half of mankind. Above the commonalty of such spirits the primitive mind recognizes higher spirits, or gods. Sometimes, by an extension of the natural order of life, the souls of great chiefs and warriors continue the same superior rank into the unseen world, and rise to divine honors. And the idea of the divine ancestor may even be carried far enough to reach supreme deity, as when the Zulus, working



## ANIMOSITY.

back from ancestor to ancestor, reach Unkulunkulu, the Old-old-one, as the creator of the world, thus attaining to monotheism by a natural development of thought. In the most rudimentary stages of religion, ethical conceptions are but feebly developed, and there is little trace of moral retribution after death. The gods require their worshipper to perform his duty towards them, but do not necessarily concern themselves with his doing his duty to his neighbor. Yet the practical effect of religion on men's lives early begins to show itself. The worship of the dead naturally encourages good morals, for the ancestor who, while alive, saw that the members of his family did right by one another, and whose condition in the spirit-world is a continuation of his earthly character and rank, will naturally insist on this being continued when he is a divine ghost, powerful to favor or to punish. Traces of the antagonism between good and evil are found also in the lower races. The world is regarded as the battle-ground of good and evil spirits, and thus arises the idea of a dualism, or contest between these ranged under a supreme good and evil deity, which attains so great development in the ancient religion of Persia.

Animism, then, appears to the savage, on the evidence of his senses, to be a rational and fairly consistent philosophy, and it has maintained its place in higher civilizations. It is taught by Lucretius, when he makes his theory of film-like images of things (*simulacra* and *membranæ*) account both for the apparitions which occur to men in dreams and the images which impress their minds in thinking; and when Democritus explained the facts of perception, by declaring that things are always throwing off images of themselves (*eidōla*), which enter the recipient soul, he was simply answering the fundamental question of metaphysics, by turning to a new purpose, as a method of explaining the phenomena of thought, the savage doctrine of object-souls. A. has been considered to lack some of the usual signs of degeneracy from a higher philosophical culture, such as survivals which show inconsistencies with it. Most primitive superstitions are found surviving, in modified form, in poetry and folk-lore, and often in common words and phrases, which have a meaning deeper than metaphor. A. is not itself a religion, but a sort of primitive philosophy; and though such philosophies practically have shaped religions, and even controlled the life of man, A. can give no scientific decision concerning either matter or spirit. It represents a religious stage which still appears in the so-called Nature-religions, or rather in the polydemonistic magic tribal religions, early developed among civilized nations into polytheistic national religions resting upon a traditional doctrine.—See Tylor's *Primitive Culture* (2 vols., 1871), on which this article is mainly founded; also *The Origin of Primitive Superstitions* (Phila., 1881), by Rushton M. Dorman. See ANIMA MUNDI.

ANIMOSITY, n. *ăn'î-mös'î-tî* [F. *animosité*, ill-will—from L. *animōsitas*, impetuosity, ardor—from L. *animus*, mind]: a hearty and spirited hatred; violent hatred; a high

## ANION—ANISOMEROUS.

degree of enmity. **ANIMUS**, n. *ăn'ĩ-mūs*, the feeling that prompts; purpose; temper; spirit—usually hostile.—**SYN.** of 'animosity': acrimony; asperity; tartness; harshness; enmity; hatred; opposition; resentment.

**ANION**, n. *ăn'ĩ-ăn* [Gr. *anĩōn*, a rising up—from *ana*, up; *eimi*, I shall go]: an electro-negative body. See **ANODE**.

**ANISE**, n. *ăn'is* [L. *anĩsum*: Gr. *anĩson*]: an annual plant whose seeds have an aromatic snell, and pleasant, warm taste; the fruit of the plant *Pimpinella anĩsum*, Ord. *Umbellif'eræ*. **ANISE-SEED** or **ANISEED**, *ăn'ĩ-sēd*, the seed of the plant. **ANISETTE**, n. *ăn'ĩ-zēt'*, aniseed cordial.

**ANISE** (*Pimpinella Anĩsum*): annual plant of the natural order *Umbellif'eræ*. The genus *Pimpinella* has compound umbels, usually without involucre. **A.** is a native of Egypt. It is an annual plant; the stem is  $1\frac{1}{2}$  to 2 ft. high, dividing into several slender branches; the lower leaves roundish-heart-shaped, divided into three lobes, and deeply cut; those of the stem pinnate, with wedge-shaped leaflets. The umbels are large and loose, with yellowish-white flowers. It is much cultivated in Egypt, Syria, Malta, and Spain, and even in Germany, especially in the district around Erfurt, where a largely quantity of the seed is annually produced. Attempts were made, more than 200 years ago, to cultivate it in England; but the summers are seldom warm enough to bring it to perfection. It is occasionally sown in gardens for a garnish or for seasoning. **A.-seed** (*aniseed*) is used as a condiment and in the preparation of liqueurs; also in medicine as a stimulant stomachic, to relieve flatulence, etc., particularly in infants; and it has been used in pulmonary affections. It has an aromatic, agreeable smell, and a warm, sweetish taste. It contains a volatile oil, called *Oil of A.*, which is nearly colorless, has the odor and taste of the seed, and is employed for similar purposes. One hundred-weight of seed yields about two pounds of oil, which is obtained by distillation; but at Erfurt the oil is made from the stems and leaves, the whole plant being aromatic. **A.-water**—water flavored with the oil, and sugared—is much used in Italy as a cooling drink.

**STAR ANISE**, or **CHINESE ANISE**, is the fruit of *Illicium anisatum*, a small tree of the natural order *Magnoliaceæ*. See **ILlicium**. It receives its name from the star-like form of the fruit, which consists of a number (6–12) of hard, woody, one-seeded carpels. The tree has evergreen leaves, somewhat like those of the common laurel. The whole plant is carminative, and is used by the Chinese as a stomachic, and as a spice in their cookery. The qualities of the fruit so much resemble those of the common anise, that it may be used instead of it, and by distillation it yields an oil which is very generally substituted for oil of anise, and is imported into Europe in considerable quantity, to be used instead of it. Star aniseed is also imported, chiefly from China and Singapore.

**ANISOMEROUS**, a. *ăn'ĩ-sōm'er-ūs* [Gr. *anĩsos*, unequal; *mēros*, a part]: in *bot.*, unsymmetrical; in *geol.*, applied to certain rocks formed in whole or in part by crystallization.



## ANISOSTEMONOUS—ANKARSTRÖM.

**ANISOSTEMONOUS**, a. *ăn'î-sôs-tēm'ô-nûs* [Gr. *anisos*, unequal; Gr. *stēmon*; L. *stāmen*, a thread, a fibre]: in *bot.*, applied to stamens not equal in number to the floral envelopes, nor a multiple of them; also **AN'ISTEM'ONOUS**, a.

**ANJOU**, *ôn-zhō'*: a former province in the n.w. of France; about 3,080 sq. m.; now forming the dept. of Maine-et-Loire, and small parts of the depts. of Indre-et-Loire, Mayenne, and Sarthe. Its cap. was Angers. The ancient inhabitants of A. were the *Andegavi*, who long and resolutely resisted the Roman arms.—The male line of the Counts of A., who took their name from it, having become extinct in 1060, their title and possessions passed by the female line to the powerful House of Gatinais; and from one of this family, Godfrey, Count of A., sprang the Plantagenets. He conquered the greater part of Normandy; assumed the title of duke; and in 1127 married Matilda, the daughter of Henry I. of England, and widow of the emperor Henry V. Through her, his son inherited the English throne, which he ascended in 1154 as Henry II. A. now became one of the possessions of the kings of England; but in 1204, the French acquired it by fortune of war; and it was bestowed as a fief upon Philip, the son of Louis VIII., and afterwards upon his brother Charles, who became the founder of that House of A. which gave kings to Naples, Sicily, and Hungary. Charles II. of Naples gave A. to his daughter Margaret on her marriage with Charles of Valois, the son of Philip IV. Her son ascended the throne of France as Philip VI. in 1328. King John, in 1360, made A. a duchy, and gave it to his son Louis, and he succeeding to the crown of Naples, it remained a possession of the kings of Naples till the overthrow of that dynasty, when René II., the last of his family, was deprived of it by Louis XI., who permanently annexed it to the French crown in 1484. Since that time it has merely given an honorary title to princes of the royal family. The last who bore it was the grandson of Louis XIV., who became Philip V. of Spain.

**ANKARSTRÖM**, *áng'kär-ström'*, JOHN JACOB; 1761–92: the assassin of Gustavus III., king of Sweden; son of a lieut.col. He was in the army as captain; but left, 1783. He was a man of violent feelings and rough manners, and much opposed to the king for curtailing the power of the senate and nobles. His hatred to the king was increased by harsh usage in a trial for treason, which ensued on certain intrigues in which he had engaged. In 1790, he went to Stockholm, and, with General Pechlin, Counts Horn and Ribbing, and others, planned the assassination of the king. A. begged that the execution of the deed might be left to him; but Horn and Ribbing disputing the point, they drew lots, and the lot fell upon A. In 1792, March 15, the king attended a bal masqué, during which A. shot at and mortally wounded him. He was instantly apprehended, and at once confessed his crime, stoutly denying that he had any accomplices. On Apr. 29, he was condemned to death, publicly flogged for three successive days, and then beheaded. He went to the scaffold with composure, rejoicing in the success of his crime.

## ANKER—ANNA.

**ANKER**, *n.* *äng'kér*: an ancient liquid measure, nearly ten gallons; now used chiefly in Denmark and Norway.

**ANKLAM**, or **ANCLAM**, *ân'klâm*: town of Prussia, prov. of Pomerania, 44 m. n.w. from Stettin; on the right bank of the Peene, 4 m. from its mouth in the Kleine Haff. The river is navigable to A., which carries on a considerable commerce, and has long been a place of commercial importance, having been admitted into the Hanseatic League in 1319. It has manufactures of linens and woollens; it has also several breweries, soap-works, and tanneries, and ship-building is actively prosecuted. During the middle ages, A. suffered more than almost any other town from fire and pestilence; and in the wars of the 17th and 18th centuries, it was again and again besieged and sacked. On the close of the Seven Years' War, in 1762, its fortifications were dismantled. It is still, however, surrounded by an old wall with three gates. It contains many interesting specimens of the Hanseatic or North German architecture, very like the Flemish. Pop. (1890) 12,917; (1900) 14,602.

**ANKLE**, *n.* *äng'kl* [*AS. ancleow*; *Dan. ankel*; *Dut. and Ger. enkel*, an ankle. *Gr. ang'kulê*, a loop, the bending of the leg]: the joint that connects the foot with the leg. **ANKLET**, *n.* *äng'klêt*, an ornament for the ankle. **ANKLED**, *a.* *äng'kld*, having or pertaining to ankles.

**ANKOBAR**, *ân-kô'bér*: former cap. kingdom of Shoa, in Abyssinia; 8,198 ft. above the sea, on the ascent of the table-land; lat. 9° 34' n., long. 30° 35' e. The higher portion of the town is fortified in a very primitive way, by a palisade of stakes, with intertwined branches of trees. The royal palace, unlike the most of the buildings, which are chiefly of wood, is built of stone and mortar, although the roof is thatched. The vegetation around the place is extremely rich, and the air is both cool and pure, so that A. is a very agreeable residence.—Pop. about 7,000; formerly increased when the king was in residence to about 15,000.

**ANN**, or **ANNAT**, *ân'nât*: in Scotch law, the half year's stipend paid to the heirs of a deceased clergyman. Compare **ANNATES**.

**ANNA**, *n.* *ân'nă*: a coin in the East Indies, value 1½d.

**ANNA, SAINT**: according to tradition, daughter of Mathan, priest of Bethlehem, and wife of St. Joachim. After 21 years of barrenness, she is said to have given birth to the Virgin Mary, the mother of the Saviour. Nothing is known regarding her life; her name does not occur in the Scriptures, nor even in the writings of the Fathers during the first three centuries. The first who mentions her is St. Epiphanius, 4th c., but towards the 8th, she was almost universally invoked. Her body was believed to have been transferred from Palestine to Constantinople in 710; and her head to Chartres, by Louis de Blois, about 1210. The inhabitants of Duren (duchy of Juliers, Germany) also pretend to have a head of St. A.; and a third is believed to be in possession of the church at Ursitz, in the diocese of Würz-



## ANNABERG—ANNA COMNENA.

burg, although numerous other churches claim to be equally favored. The Rom. Cath. Church has a festival in her honor, Jul. 26; the Greek, Dec. 9. In Austria, Bavaria, and other Rom. Cath. countries, this festival is of great importance. In her honor, the Fraternity of St. A. was instituted in the 13th c.; organized anew by the Jesuits after the Reformation.

ANNABERG, *ân'nă-běrg*: town of the kingdom of Saxony, dist. of Zwickau; on the right bank of the Sehm, 18 m. s. from Chemnitz. It is 1,800 ft. above the sea, among hills containing mines of silver, tin, cobalt, and iron. It has extensive manufactures of lace and of silk ribbons. The ribbon manufacture was introduced here by Protestant refugees from Belgium, who fled from the persecution by the Duke of Alva. Pop. (1880) 12,956; (1890) 14,960.

ANNA CARLOVNA, *kar-lov'ná*: Regent of Russia during the minority of her son Ivan; d. 1745: daughter of Charles Leopold, Duke of Mecklenburg, and of Catharine, sister of the Russian empress, Anna Ivanovna (q.v.). In 1739, A. married Anthony Ulric, Duke of Brunswick-Wolfenbüttel. Her son Ivan, b. 1740, Aug. 20, was nominated by the empress Anna Ivanovna as her successor. This was done at the instigation of Biron (q.v.), the empress's favorite, whose object was to secure the regency for himself; and the empress, on her death-bed, actually appointed him regent, but he continued in power only for a short time: she died, 1740, Oct. 28; and his overthrow was on Nov. 18. A. now proclaimed herself grand-duchess and regent of Russia; but showed no capacity for managing the affairs of a great country, spent her time in indolent enjoyments, and resigned herself to the guidance of one of the ladies of her court, Julia von Mengden. A conspiracy raised to the throne Elizabeth, daughter of Peter the Great and of Catharine, 1741, Dec. 6; the infant Ivan was sent to the castle of Schlüsselburg, where he was murdered; Anna and her husband were condemned to imprisonment for life, and conveyed to Cholmogory, a town upon an island in the Dwina, near the White Sea. Here she bore two children, and died in childbed. Her husband remained a prisoner for 39 years, till his death.

ANNA COMNENA, *com-nē'na*: 1083, Dec. 1—1148; daughter of Emperor Alexius I. (Comnenus): learned Byzantine princess, author of one of the most valuable works in the collection of the Byzantine historians. She received the best education that Constantinople could give, and early showed fondness for literary pursuits; but was also habituated from childhood to the intrigues of the court; and during the last illness of her father, she entered into a scheme, which her mother, the empress Irene, also favored, to induce him to disinherit his eldest surviving son, John, and to bestow the diadem on her. Failing in this, she framed a conspiracy against the life of her brother (1118); and when her husband, Nicephorus Bryennius, a Byzantine nobleman, either from timidity or virtuous principle, refused to join in it, she passionately lamented that she had not been born a

man, and upbraided him as having the soul of a woman. Her brother spared her life, but punished her by confiscation of her property, which, however, he soon after generously restored. Disappointed and ashamed, she withdrew from the court, and sought enjoyment in literature. On the death of her husband (1137), she retired into a convent, where she died. Her life of her father, entitled *Annæ Comnenæ Alexiadōs* *βιβλίον* 19, is full of professions of careful inquiry and a supreme regard for truth, but 'the perpetual strain of panegyric and apology awakens our jealousy.' The style is characterized by an elaborate affectation of rhetoric. The best edition is that of Schopen (2 vols., 1839). See Oster's *A. Comnena* (1868-71).

ANNA IVANOVNA, *e-vâ-nov'nâ*, Empress of Russia: 1693, Feb. 8—1740, Oct. 28; second dau. of Ivan, elder bro. of Peter the Great. She was married in 1710 to the Duke of Courland, the last of his race, who died in the following year; and she obtained the duchy of Courland for her favorite, Biron, a Courlander of low birth. The throne of Russia was offered to her by the Supreme Council on the death of Peter II. in 1730, on conditions which greatly limited the power of the monarchy, but which she soon broke. Her elevation to it was very much owing to the intrigues of the chancellor Ostermann, who had had charge of her education, but who was disappointed in finding her not grateful and tractable, as he expected. For three years, however, her rule was mild, humane, and equitable. The army was reformed, greater liberty was allowed to the landed gentry, government debts were paid, and the poll-tax for the serfs lessened; but her paramour, Biron, having determined to govern the nation as well as the empress, a sudden and deplorable change ensued. This man, a blood-thirsty and avaricious wretch, established something like a reign of terror through the land. He is said to have banished not less than 20,000 persons to Siberia; numbers were knouted, had their tongues cut out, or were broken alive on the wheel. Eleven thousand perished in this way. Prince Basil Dolgoruki, and others of his family, suffered the ignominy of the scaffold. After a reign of 10 years the health of the empress gave way; she died, and left the throne to her grand-nephew, Ivan, with Biron as regent. See ANNA CARLOVNA: BIRON: RUSSIA.

ANNALS, n. *ăn'nălz* [L. *annālis*, belonging to the year—from *annus*, a year]: a brief narrative of events divided into periods, each period consisting of one year; year-books. AN'NALIST, n. a writer of annals. The name is derived from the oldest historical documents of the Romans, the *Annales Pontificum*, or *Annales Maximi*, the duty of drawing up which devolved upon the *Pontifex Maximus*; but these were all destroyed by the Gauls at the sack of Rome, and some hundreds of years before the time of Christ. After the Second Punic War, similar A. were composed, not, however, by the priests, but by educated members of the Roman laity, such as Fabius Pictor, Calpurnius Piso, etc. Still later, the term was applied to any historical work



## ANNAM—ANN ARBOR.

that followed the order of time in its narrations, dividing them into single years—as, for instance, the *A.* of Tacitus.

ANNAM: see ANAM.

ANNAMABOE, *á'nâ-ma-bo'*: small seaport, protected by a strong British fort, on the Gold Coast of Africa; lat.  $5^{\circ} 5'$  n., long.  $1^{\circ} 5'$  w., 10 m. e. of Cape Coast Castle. In 1807, the inhabitants took part with the Fantees against the Ashantees, in consequence of which the town was attacked by an overwhelming force of the latter, and most of the inhabitants were slain. There is little trade in anything but gold. Pop. between 4,000 and 5,000.

AN'NAN: seaport, and royal and parliamentary burgh, in the county of Dumfries; on the A. river, near its entrance into the Solway Firth. It is neat and well built; among the chief industries are tanning and bacon-curing. The river, which affords excellent salmon-fishing, is spanned by a bridge of three arches, and is navigable to within half a mile of the town for vessels of 250 tons; while considerably larger vessels can enter the mouth of the river, half a mile below. There is regular communication by steamers with Liverpool and Whitehaven; and the Glasgow and Southwestern and Caledonian railways connect the town with Edinburgh, Glasgow, and Carlisle. The burgh unites with Dumfries, etc., in returning one member to parliament. Pop. (1881) 3,366; (1891) 4,858.

ANNANDALE: see DUMFRIESSHIRE.

ANNAPOLIS, *ăn-năp'ô-lis'*: city and port of entry, cap. of Maryland, and of Anne Arundel co.; on the s. bank of the river Severn, 2 m. from its entrance into Chesapeake Bay, 37 m. e. by n. of Washington, 30 m. s. by e. of Baltimore—lat.  $38^{\circ} 58' 50''$  n., long.  $76^{\circ} 29'$  w. The A. and Elkridge railway, 21 m. long, connects the port with Baltimore and Washington. A. contains an imposing statehouse, a bank, and six churches. It is the seat of St. John's College, and of the U. S. Naval Academy (q.v.). Three newspapers are published. The town was founded 1649, and is attractive by its historical associations, and its natural situation. Pop. (1890) 7,604; (1900) 8,402.

ANNAPOLIS: seaport of Nova Scotia; lat.  $44^{\circ} 40'$  n.; on the river A., that runs into the Bay of Fundy. Its harbor is excellent, though somewhat difficult of access. A. is the oldest European settlement n. of the Gulf of Mexico, having been established in 1604 by the French as the cap. of their prov. of Acadia, under the name of Port Royal. Acadia having been conquered by the English in 1710, and ceded by the French in 1713, Port Royal changed its name in honor of Queen Anne, continuing to be the seat of government, till, 1750, it was superseded by the newly-founded city of Halifax, on the outside coast of the peninsula—the new cap., with its better position and superior haven, having diverted most of the trade of the place. Since then, A. has decayed. Pop. (1891) 959; (1901) 1,019.

ANN ARBOR: flourishing city of Michigan, cap. of Washtenaw co.; on the Huron river, and the Michigan Cen-

tral and the Toledo and A. A. railroads; 38 m. n. w. of Detroit. The city has an active trade; and manufactories of carriages, furniture, blinds, agricultural implements, paper, and woollen goods. There are mineral springs and a hydro-pathic establishment. A. A. is the seat of one of the chief universities in the United States. See MICHIGAN, UNIVERSITY OF. The high rank of this institution has made the city an important literary centre and an attractive place of residence. The A. A. school system is well organized; its High School is a celebrated preparatory institution. There are 15 churches; one daily and six weekly newspapers; gas and electric plants; electric railway and water-works. The population comprises a large German element. Pop. (1880) 8,061; (1890) 9,431; (1900) 14,509.

ANNATES, *än'nätz*, or AN-NATS, *än'nätz*, or FIRST-FRUIT, n. plu. [F. *annate*—from mid. L. *annāta*, a yearly revenue—from L. *annus*, a year]: In the ecclesiastical law of England, the value of every spiritual living for a whole year, which the pope, claiming the disposition of every spiritual benefice within Christendom, reserved out of every living. This impost, levied at first only from persons appointed to bishoprics, was afterward extended to the inferior clergy. The value of these A. was according to a rate directed by Pope Innocent IV. (1253), and increased by Pope Nicholas III. (1292). When this papal exaction was abolished under Henry VIII., the right to A. or First Fruits, then about £3,000 a year was annexed to the crown. See FIRST FRUITS: QUEEN ANNE'S BOUNTY.

ANNATTO, or ANNOTTO: see ARNOTTO.

ANNE, *än* or *än'neh*, OF AUSTRIA: 1602–66; dau. of Philip II. of Spain; in 1615 became the wife of Louis XIII. of France. The marriage (the husband's age 14 years) was so far from happy, that the royal pair lived 23 years in virtual separation—due chiefly to Cardinal Richelieu, whose fixed determination to humble the House of Austria led him to spare no means for alienating the affections of Louis from his queen, by representing her as involved in dangerous conspiracies against his authority. The naturally grave and phlegmatic disposition of the queen was not such as to counteract the hostile influence of the great minister. On the death of the king, 1643, A. became queen-regent, and evinced her discernment by choosing as her minister Cardinal Mazarin, by whose able management the young king (Louis XIV.) came, at his majority, into possession of a throne firmly established on the ruins of contending parties. The character of A. had much influence in molding that of her son. She possessed the same cold and haughty temper, combined with the power to charm by a condescending grace, the same love of pomp and power, and the same skill in the choice of able instruments, thus compensating for the lack of genuine personal greatness. Two curious personal peculiarities of this queen are mentioned by biographers—her antipathy to roses, so strong that while passionately fond of flowers and perfumes, she could not endure the picture of a rose; and the extraordinary delicacy of her skin, which made Mazarin



## ANNE.

remark, that 'if her majesty were condemned to the infernal regions, her hell would be to sleep in brown hollands.'

ANNE, Queen of Great Britain and Ireland, last British sovereign of the House of Stuart: 1664, Feb. 6—1714, Aug. 1, reigned 1702–14; b. Twickenham near London; second dau. of James II. of England and VII. of Scotland (who at the time of her birth was Duke of York), by his first wife, Anne Hyde, dau. of the famous Clarendon. When she was about 7 years of age, her mother died; and her father soon afterward professed himself a member of the Church of Rome; but he permitted his daughters to be educated in the Church of England, to which A. always retained an ardent if not a very enlightened attachment—seldom manifesting, in the whole of her life, so much resolution and independence as in her resistance to the attempts of her father, after his accession to the throne, to induce her to join the Church of Rome, accompanied, as it were, with the offer that she should be preferred in the succession to her sister Mary. To advance his own popularity her father gave her in marriage, in 1614, to Prince George of Denmark, brother to Christian V., an indolent and good-natured man, who concerned himself little about public affairs, and was endowed with no capacity for taking part in them. A.'s own weakness of character and that of her husband gave opportunity to Lady Churchill, afterward Duchess of Marlborough, her early playfellow, to acquire an influence over her, which, during many years, was almost supreme. During the reign of her father, A. lived in retirement, taking no part in politics. On the landing of the Prince of Orange, she seems at first to have hesitated, and even to have been inclined to adhere to the cause of her father, whose favorite daughter she was; but Lord Churchill had made up his mind to an opposite course, and his wife induced the princess to adopt it. She consented to the act by which the throne was secured to the Prince of Orange in the event of his surviving her sister Mary; but quarrelled with her sister about questions of etiquette, and was afterward drawn into intrigues, in which the Churchills were engaged, for the restoration of her father, or to secure the succession of the throne to his son. She even entered into a secret correspondence with her father. She was herself childless, when, on the death of William III., 1702, Mar. 8, she succeeded to the throne. She bore indeed 17 children; but only one, the Duke of Gloucester, survived infancy, and he died in 1700, at the age of 11. The influence of Marlborough and his wife was most powerfully felt in all public affairs during the greater part of her reign. The strife of parties was extremely violent, and political complications were increased by the queen's anxiety to secure the succession for her brother. So far as she had any political principles, they were opposed to that constitutional liberty of which her own occupancy to the throne was a sort of symbol, and favorable to absolute government and the assertion of royal prerogative according to the traditions of her family. These principles and her family attachment, tended to alienate her from the Marlboroughs,

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whose policy, from the time of her accession, had become adverse to Jacobitism, and who now, with Godolphin, were at the head of the whig party. The duchess also offended the queen by presuming too boldly and haughtily upon the power which she had so long possessed. A. found a new favorite in Mrs. Masham, a relation of the duchess, whom she herself had introduced into the royal household. To Mrs. Masham's influence the change of government in 1710 was in a great measure owing, when the whigs were cast out, and the tories came into office, Harley (afterwards Earl of Oxford) and St. John (Lord Bolingbroke) becoming the leaders of the ministry. But, although concurring more or less in the queen's design to secure the succession of the throne to her brother the new ministers had quarrels among themselves, which prevented its successful prosecution, and it oozed out sufficiently to alarm the nation, and to alienate many of their political supporters. A dispute between Oxford and Mrs. Masham, carried on for hours in the queen's presence, and which terminated in her demanding his instant resignation, seems to have brought on the attack of apoplexy of which she died. A. was the last sovereign who reigned over England and Scotland as separate kingdoms: the union of the two was in 1707. She was the first styled Sovereign of Great Britain. The Elector of Hanover succeeded her as George I.—Queen A. was of middle size, and comely, though not beautiful. She was virtuous, conscientious, and affectionate, more worthy of esteem as a woman than of admiration as a queen. Her reign has been called the 'Augustan Age of England,' as a period rendered illustrious by some of the greatest names, both in literature and science, which her country has ever produced. See J. H. Burton's *History of the Reign of Queen Anne* (3 vols. 1880).



## ANNEAL.

**ANNEAL**, *v.* *ăn-nēl'* [AS. *an*, on: It. *niello*, a kind of black enamel on gold or silver: F. *neeler*, to enamel: mid. L. *nigellārē*, to blacken]: to temper; to heat glass or metal, and then to cool slowly, in order to render less brittle; to heat glass or tiles, etc., in order to fix the colors laid on them. **ANNEAL'ING**, *imp.*: N. the act or process of tempering glass, etc. **ANNEALED**, *pp.* *ăn-nēld'*. **ANNEAL'ING FURNACE**, a furnace for annealing (*q.v.*).—*Annealing* is the act or process of tempering glass and various metals to give them hardness combined with tenacity. The brittleness of glass vessels and metal castings that are allowed to cool rapidly immediately after manufacture is due to difference of tension between the molecules near the surface (the 'skin') and those in the interior. Newly blown glass is entirely unfit for use; and the common occurrence of the breaking of lamp chimneys when lamps are lighted, or of tumblers when hot water is poured into them, is proof of insufficient annealing. A striking example of the instable nature of unannealed glass is seen in the philosophical toy known as 'glass tears' or Prince Rupert's drops (*q.v.*), in which the mere breaking off of the tail causes the whole to fly to dust with a sharp explosion. Annealing, or slow cooling, produces a more or less uniform arrangement of the molecules throughout the mass. Glass in the process of annealing is kept for sometime in the kiln or oven in a state approaching fluidity: the thicker the glass the more careful must be the annealing, and the longer the process; very thin glass requires little or no annealing, being, so to speak, all skin; and glass thread needs no such treatment to make it as flexible as silk fibre. Plate glass of the kind used for show windows must be very carefully annealed before being ground and polished, otherwise it cannot stand the scratching of the surface. Imperfection in this respect is often revealed by the spreading in every direction of a crack once begun. The annealing of plate glass takes two weeks; small articles in glass are annealed in 6-60 hours, according to their thickness and weight.

In metals, both castings and forgings often need to be annealed. The coppersmith who hammers a flat sheet of copper into a vessel of any form that he chooses, must quit hammering at intervals and anneal the mass to prevent it from going to pieces under his blows. In manufacture of sheet-brass, the rolling, by which it is gradually reduced in thickness, makes it so hard that it has to be annealed several times during the operation. But in this case the annealing is conducted in a reverberatory furnace, and lasts only a few minutes. The sheet-brass is simply raised to a blood-red heat and then withdrawn, this being sufficient to restore the ductility of the metal. Articles made of brass and other metals by stamping, particularly such articles as require many blows of the stamp to bring them into shape, are repeatedly annealed during the process. In the case of coins, as they receive only one blow of the coining-press, the metal blanks are annealed before they are stamped. A steel matrix, from which die-

## ANNEAL.

punches are impressed—usually a work of much labor—is put through the annealing process after every few blows in the die-press. German silver, which is composed of three kinds of metal, is difficult to anneal, from its tendency to crack in the process. Wheels and axles of railroad cars become dangerously brittle from the constant vibration to which they are subjected; they require to be re-worked and annealed anew to restore their toughness. Hollow ware (q.v.) of cast iron must be annealed before it can be turned bright for tinning; and large iron castings are kept covered in their molds—sometimes with hot cinders—for a month or more, to prolong the time of cooling. Like thick glass, these iron castings sometimes break spontaneously. Annealing is used also in the arts of gold-beating, wire-drawing, nail-making, etc. Tin, lead, and zinc are annealed by the use of boiling water, and steel tools by immersion in hot oil, both liquids being allowed to cool slowly. Many experiments have shown that steel boiler-plates and ship-plates are made stronger by annealing them in oil, or in melted lead, or by simply heating them to redness in a slow furnace, and afterward covering them with sand or ashes to prevent them cooling rapidly or unequally.

The real nature of the change which metals undergo by annealing is not thoroughly understood. Most of the malleable metals are susceptible of two distinct forms: one, the crystalline, which they assume by slow cooling; the other, the fibrous, which is acquired by hammering or rolling. But when this is carried beyond a certain point, the metal becomes so hard that it cannot be bent far without breaking, and recourse must be had to annealing. Yet if the annealing be continued long the malleability diminishes, and the metal has again crystalline fracture. Zinc by wire-drawing becomes very flexible, and acquires a degree of tenacity equal to that of copper; but if kept in boiling water for some time it resumes its original brittleness, and when broken shows a crystalline appearance. Thus, little can be said of the theory of annealing: we must be content with simple enumeration and classification of the facts. Tempering (q.v.) has been called the inverse process of annealing.



## ANNECY—ANNELIDA.

ANNECY, *án'sě*: town of the dept. of Haute Savoie, France, at the n.w. extremity of the lake of A.; 21 m. s. from Geneva. The lake of A., about 9 m. long by 2 m. wide, is 1,426 ft. above the sea; surrounded by magnificent mountain scenery. Its waters flow by the Firan to the Rhone. In the 12th c. A. was called *Anneciacum novum*, to distinguish it from Old A., *Anneciacum vetus*, which occupied the slopes of a neighboring hill, and was a place of some consequence in the times of the Romans. In the earlier middle ages, A. belonged to the Counts of Geneva, and on the extinction of that house, it passed to the House of Savoy, in whose possession it remained, except for a brief period under the French empire, until the transference of Savoy to France, in 1860. It has manufactures of linens, cotton-yarn, glass, sulphuric acid, and steel-wares. It has had linen bleachfields since 1650. The town is clean, and has an air of respectable antiquity. The shops in many of the streets are under arcades. The most remarkable buildings are the château, once the residence of the family of Genevois-Nemours, the old bishop's palace, the cathedral; and the modern church of St. Francis, which boasts of possessing the relics of St. Francis of Sales and La Mère Chantal. Pop. (1881) 10,740; (1891) 11,947; (1896) 12,894.

ANNELIDA, n. plu. *ăn-něl'î-dă*, or AN'NELIDS, n. plu. *-něl-îdz* [L. *annel'lus*, a little ring; Gr. *eidos*, resemblance]: the ringed worms, comprising leeches, lob-worms, earth-worms, etc. See WORMS: for new classification of the orders see under *Vermes* in ZOOLOGY. They have a more or less elongated body, always composed of numerous rings. The first of these rings assumes, in most of them, the characters of a head, but in some there is no proper head. They have no articulated limbs, but most of them are provided with bristles and hairs, often in numerous bundles, which are of use to them in locomotion; some, which want these, are furnished with suckers at the extremities, and employ them for this purpose; some remain fixed in one place. Their bodies are always soft, and without external or internal skeleton; but some of them form for themselves a calcareous covering by exudation; others form coverings partly by exudation and partly by agglutination. Their blood is generally red, but not from red corpuscles, as in the vertebrate animals; sometimes it is greenish or yellowish. Their ner-



Sandworm (*Arenicola piscatorum*).

vous system is simple. Many of them have eyes, and many have tentacula. Most of them live in water, and of these the greater part inhabit the sea. Those which live in water breathe by gills, which are variously formed and placed; some which are terrestrial, as earthworms, have, instead of gills, numerous small respiratory sacs. They are all hermaphrodite; most of them, however, requiring mutual fecundation, and most of them are oviparous. They feed

## ANNEX—ANNISTON.

mostly on other animals. They are an order of the class *Annulata* (of which the other order, *Hirudinea*, includes leeches), and are divided into two sub-orders: 1. *Oligochaeta*, meaning few bristles (example, earth-worm); 2. *Chaetopoda*, meaning bristle-feet (examples, sea-worms). An older classification was: 1. *Suctorioria* or *Hirudinea*; 2. *Terricola*; 3. *Tubicola*, with head gill-tufts and inhabiting tubes; 4. *Errantia* or *Dorsebranchiata*, gills on back; and a class by Huxley to include the marine *Sagitta*.

**ANNEX**, v. *ăn-něks'* [F. *annexer*, to annex, to unite: L. *annexus*, tied, fastened on to—from L. *ad*, to: *nexus*, tied]: to join on to the end; to bind; to unite to; to affix. **ANNEX'-ING**, imp. **ANNEXED**, pp. *ăn-někst'*. **ANNEXIBLE**, a. *ăn-něks'î-bl*, that may be annexed. **ANNEXATION**, n. *ăn'něks-ă'shŭn*, the act of uniting or joining to; addition of something. **ANNEXA'TIONIST**, n. *-shŭn-îst*, one who favors annexation. **ANNEXION**, n. *ăn-něk'shŭn*, or **ANNEX'MENT**, n. the act of annexing; addition. **ANNEXE**, n. *ăn-něks'* [F.]: a wing to a building, or an outbuilding communicating with the main one.—**SYN.** of 'annex': to unite; add; join; coalesce; append; affix; bind to.

**ANNIHILATE**, v. *ăn-nî'hî-lât* [L. *annihilâ'tus*, annihilated—from *ad*, *nîhil*, nothing: F. *annihiler*]: to reduce to nothingness; to destroy a body utterly, or the peculiar properties of a body. **ANNI'HILA'TING**, imp. **ANNI'HILA'TED**, pp. **ANNI'HILA'TOR**, n. that which. **ANNI'HILA'TION**, n. *-hî-lâ'shŭn*, the act of reducing to nothingness; a total destruction.

**ANNIHILATIONISM**: disbelief in existence after death; denial of man's immortality. In theol., A. is the doctrine that, for the incorrigibly wicked, future punishment will either be, or end in, utter extinction of being. One theory is that this will be a special destruction; another is that it will be the withholding of the gift of eternal life.

**ANNISTON**, *ăn'nîs-ton*: city in Calhoun co., Ala.; at the crossing of the E. Tennessee Virginia and Georgia, and the Georgia and Pacific r.r.s.; 60 m. from Birmingham, 100 m. from Atlanta. A. was founded 1872 by Samuel Noble (d. 1888, Aug. 14), an iron founder; it is in the heart of the great southern iron region, within 25 and 45 m. of the Coosa and Cahawba coal-fields, and near vast supplies of timber. The town was incorporated 1879, but the sale of land began 1883. The company owns 30,000 acres coal land and 75,000 acres brown and red hematite iron ore; has cap. \$10,000,000; employs 6,000 workmen; pays \$60,000 wages weekly; and had (1889) 4 charcoal and 2 coke furnaces in operation.—A. has good supply of churches and schools and 2 daily newspapers; and had (1890) 1 national bank (cap. \$200,000), 1 savings bank (cap. \$100,000), 1 private bank, the largest pipe works in the country, r.r. rolling-stock works (plant \$1,000,000), cotton compress (capacity 1,000 bales daily), 4 local r.r.s. connecting with trunk lines, 2 foundries, rolling mill, machine-shops, boiler and sheet-iron works, and various mills and factories. The city has gas and electric



## ANNIVERSARY—ANNOUNCE.

light, artesian well-water, thorough drainage, macadamized streets, and street r.rs.—Pop.(1890) 9,998;(1900) 9,695

**ANNIVERSARY**, n. *ăn'nĩ-vér'sér-ĩ* [F. *anniversaire*, an anniversary—from L. *anniversārius*, yearly—from L. *annus*, a year; *versus*, turned]: a day, which returns with the year; the day on which an event is annually celebrated: the yearly return of any event.: **ADJ.** recurring at a stated time; returning with the year.

**ANNOBON**, *ăn'no-bôn'*, or **ANNABON**: island in the Gulf of Guinea, about  $1\frac{1}{2}^{\circ}$  s. of the equator; belonging to Spain; 6 sq. m. Its basaltic, trachytic, and volcanic mountains render A. picturesque. Pop. about 3,000.

**ANNO DOMINI**, *ăn'nō dōm'ĩ-nĩ* [L.]: in the year of the Lord; the year of the Christian era: abbreviated, A.D.

**ANNO HEGIRÆ**, *ăn'ō hēj'ĩ-rē* [L.]: in the year of the hegira, i.e., of the flight of Mohammed from Mecca, A.D. 622: see **HEGIRA**.

**ANNO MUNDI**, *ăn'ō mŭn'dĩ* [L.]: in the year of the world: a phrase employed in dating occurrences from the creation.

**ANNONAY**, *ăn'nō-nā'* (anc. *Annoneum* or *Annoniacum*): town of the dept. of Ardèche, France; at the junction of the Deaume with the Cance, which unite in the centre of the town; 37 m. s. from Lyons. It is active and prosperous, the chief manufacture being paper, employing 1,500 hands. There are manufactures, also, of glove-leather, mostly from kid-skins, and of silk and cotton twist, and woolen cloth. The paper mills were established by the father of the aëronauts Montgolfier (q.v.), who were born here. The situation of A. is picturesque and remarkable; the houses are placed among rocks, and some streets are very steep.—Pop. (1891) 17,626; (1896) 17,028.

**ANNOTATE**, v. *ăn'nō-tāt* [L. *annōtātus*, set down in writing—from *ad*, to or at; *nōta*, a mark: F. *annoter*, to annotate]: to mark or note down in writing; to make written remarks on a book. **AN'NOTA'TING**, imp. **AN'NOTA'TED**, pp. **AN'NOTA'TION**, n. *-tā'shŭn*, a written remark on some passage of a book; a note; generally used in the plu. **AN'NOTA'TIONS**. **ANNOTATORY**, a. *ăn-nō tā-tér'ĩ*, containing annotations. **ANNOTATOR**, n. *ăn'nō-tā-tér*, one who writes notes on a book.—**SYN.** of 'annotation': note; comment; commentary; observation; remark.

**ANNOTINOUS**, a. *ăn-nōt'ĩn-ŭs* [L. *annōt'ĩnus*, a year old—from *annus*, a year]: in *bot.*, having reached a year old, indicated by last year's shoot showing a visible point of junction.

**ANNOTTO**, n. *ăn-nōt'ō*: see **ARNOTTO**.

**ANNOUNCE**, v. *ăn-nouns'* [F. *annoncer*; It. *annunziare*, to declare—from L. *annunciārē*—from *ad*. to; *nunciō*, I tell]: to tell to; to declare; to publish. **ANNOUN'CING**, imp. **ANNOUNCED'**, pp. *-nounst'*. **ANNOUNCEMENT**, n. *ăn-nouns'měnt*, a declaration; the act of giving notice; publication. **ANNOUNCER**, n. *ăn-noun'sér*, one

## ANNO URBIS CONDITÆ—ANNUAL REGISTER.

who.—SYN. of 'announce': to proclaim; publish; declare; pronounce; promulgate.

ANNO URBIS CONDITÆ, *ăn'nō ér'bis kōn'dī-tē* [L.]: in the year from the founding of the city (meaning Rome), B.C. 753, according to accepted chronology; used in connection with a Latin date: abbreviated A.U.C.

ANNOY, v. *ăn-noy'* [It. *annoiārē*; OF. *anoier*; F. *ennuyer*, to annoy or vex—from L. *in odīo*, in hatred, hateful or repugnant to: Sp. *enoyo*, anger, offense]: to inspire with hatred or repugnance; to vex; to tease or molest; to harass: N. trouble; injury. ANNOYANCE, n. *ăn-noy'ăns*, that which inspires with hatred or repugnance; state of being annoyed; a matter that harasses or molests. ANNOY'ER, n. one who. ANNOY'ING, imp. ANNOYED', pp. *-noyd'*.—SYN. of 'annoy, v.': to molest; tease; trouble; vex; perplex; pester; embarrass; incommode; injure.

ANNUAL, a. *ăn'nū-ăl* [F. *annuel*; It. *annualē*; L. *anuālis*, annual—from L. *annus*, a year]: yearly; that returns every year: N. a flower or plant that grows and dies within a year; a book published every year. AN'NUALLY, ad. *-lī*. ANNUITY, n. *ăn-nū'ī-tī*, a fixed sum of money paid every year. ANNUITANT, n. *ăn-nū'ī-tănt*, one who receives a sum of money every year for maintenance.

ANNUAL, in Botany: a plant whose life is limited to a single year; within which the germination of the seed, all the functions of vegetation, the ripening of new seed, and the death of the plant, are included. The whole duration of life in the plants thus designated is indeed generally much less than a year, and in temperate and cold climates, falls within the brief period of the summer months. They, as well as the plants generally called biennial, produce flowers and fruit only once. Some species are generally A., and others generally biennial; but whether an individual plant is A. or biennial, often depends upon the accidental circumstance of the season at which the seed germinates, and may therefore be artificially determined by the time of sowing. Peculiar circumstances, also, sometimes convert A. into biennial, or even perennial plants; and those which are mere annuals in one climate, are perennial, or even shrubby, in another, of which the Castor-oil plant is a notable example. Most kinds of grain are the produce of A. grasses; some of which, however, as wheat, in certain circumstances, prove of longer duration. The *annuals* cultivated in flower-gardens are very numerous; and many species, both native and foreign, bear most beautiful flowers.

ANNUAL REGISTER: historical, political, and statistical review of the year. The first volume of the English A. R. appeared 1759. Of similar publications preceding were Boyer's *Political State of Europe*, monthly numbers and yearly vols. 1711–39; and the *Historical Register*, quarterly, 1716–38. The historical narrative, and some other portions of the A. R. were prepared by Edmund Burke for several years. In Paris is pub. the *Annuaire des Deux Mondes*, connected with the review of that name.—In



## ANNUALS.

the United States this line of publications is represented by *Appleton's Annual Cyclopædia*; and by the annual volume of the *Columbian Cyclopædia*, known as the *Cyclopedic Review of Current History*.

ANNUALS. class of publications in yearly series, which formerly had great public favor; intended for Christmas, New-year, and birthday presents. They were illustrated by exquisitely-engraved prints, from paintings by artists of the highest talent, and contained prose and poetry by most of the best writers of the day. The first, the *Forget-me-not*, was begun, London, 1822: the idea and the title were adopted from Germany. The next year, the sorfollowedtwo—*Friendship's Offering* and the *Graces*. All three contained at first also the blank pages for memoranda, cash accounts, etc., customary in the Gift Pocket-books of previous times. The *Literary Souvenir*, begun 1824 by Alaric A. Watts, was the first to discard these. The *Keepsake*, begun 1827, was published at a guinea: its first editor was W. H. Ainsworth. The following year, the editorship was offered to Sir Walter Scott, with salary of £800, and payment besides for his contributions, but was declined. The *Keepsake* always maintained an aristocratic character. the contributors preferred being those who wore a title. In 1840, it was edited by Lady Emmeline Stuart Wortley, and afterward by the Countess of Blessington. The *Book of Beauty*, long one of the best of the class, was begun 1833: its first vol. was written by Miss Landon (L. E. L.); and the editorship of the Countess of Blessington began with the second vol. and continued till the close of her life. At first, the A. were bound in tinted paper, then in silk; then followed morocco bindings, and afterward velvet. Much money was expended on the several departments. Sums varying from 20 to 150 guineas were paid to artists for the loan of pictures for engravings of the size of four inches by three, and engravers frequently received 150 guineas for production of one plate. For several years 150,000 copies of A. were yearly sold. The sale of the *Forget-me-not* was at one time 20,000 copies. In 1829 no fewer than 17 A. were published in Great Britain; and the issues in the United States also were numerous, such as the *Gift* and the *Token*.—After 1840, better tastes in literature began to prevail, and the A., whose number had dwindled to 9, lost both their artistic and their literary excellence. Their sentimentalism no longer charmed, and on both sides of the Atlantic they dropped out one by one. The *Literary Souvenir* had ended with its 10th vol. 1834. The *Forget-me-not*, earliest in the field, saw its 22d year, and passed away 1844. The *Book of Beauty* and the *Keepsake* became the only survivors; and 1856 the *Keepsake*, sole relic of its class in Britain, made its final issue.

## ANNUITY.

**ANNUITY:** a sum of money paid annually. The term, in its full meaning, expresses an obligation on one party to pay, and a right in another to receive the amount. Annuities are of many various kinds. An A. may be for the life of any person, becoming extinguished only by his death. It may be perpetual, so that as each enjoyer of it dies, his heirs may succeed to it. It may be on the life of the survivor of any number of persons—for instance, a father may leave to his five daughters an A. of \$2,500 a year from his estate, to be paid to the latest survivor, so that while the five are alive, they have \$500 each; after the first death among them, the lapsed share is distributed among the survivors, giving them \$625 each; and so on, the last survivor receiving the whole \$2,500. On the other hand, each might have a separate A. terminating at her death; and again, instead of either of these simple arrangements, there might be, and often is, a more complex adjustment, giving the survivors on each death a certain proportion only of the deceased's A. An A. may begin immediately, and stop on a contingency, such as the death of a person to whom the annuitant is heir. It may be 'deferred,' so as to begin to be payable only after the lapse of so many years; and then it may either be payable absolutely in perpetuity, or for a given number of years, or it may be payable to an annuitant only for the remaining years of his life, if he survive the contingency.

The fixed elements of calculations of annuities, independently of this almost countless variety in nature, are in themselves double—vital statistics, and the profit or interest of money. As to the vital statistics, they can apply, of course, only to the adjustment of annuities on a large scale. If a person should sell a single A.—that is to say, engage for a sum down to pay a certain person an A. for life—no study of vital statistics could make his bargain other than a chance; and though he went on the most approved tables, it might occur either that the annuitant dies immediately, leaving the whole purchase-money as his profit, or that the annuitant lives to extreme old age, and renders him a great loser by the bargain. But on a large, and especially on a national scale, the rate of mortality and the value of life may be so nicely rendered in statistics, that a market may be opened for the purchase and sale of annuities at their exact value—that is to say, at such a rate that the sum paid in from time to time by persons purchasing annuities, shall just serve to pay each annuitant's annual claim. Such vital statistics, however, can only be obtained through a very accurate and long-continued Registration of Births, Deaths, and Marriages (q.v.); and it is known that the British government, having adjusted the price of annuities by the celebrated Northampton Tables, contracted a losing bargain with their annuitants as a body, and, without being aware of it, sacrificed considerable public money.

The second element, besides vital statistics, in the calculation of annuities, is the profit or interest of money. If this did not require to be considered, an A. of \$5 a year for ten years would just cost \$50. But while paying the A., the



## ANNUITY.

person who has engaged for it is drawing the interest of the money. If he sold an A. of \$5 a year for ten years for \$50, he would be drawing the interest of \$50 for the first year, \$45 for the second, and so on; and the annuitant's bargain would be to a like extent disadvantageous. As the interest of money may be various, so may this element of the calculation of an A.; and to calculate it with reference to future indefinite variations, is of course impossible. It will be seen at once that when the variety of kinds of A. have to be adjusted to different rates of profit, an immense field is opened for calculation. It is, in fact, a province of algebraic science in which reputations have been achieved.

The interest, as it is termed, of the national debt is virtually a multitude of perpetual annuities. In a country like England, where there is much superabundant wealth, there is so vast an amount of capital for which people want only interest, that although the lenders of the money are not repaid by the government, yet when any one has invested in the funds, if he wants his money back, he is sure to find a person to take his place at something near to the price paid by him. This would not be the case were the quantity of these annuities in the market disproportioned to the number desiring to invest in them; and hence it is that when there is depression of trade, and money wanted to meet obligations, the funds fall. The government has the largest field of operation, and therefore it is natural to infer that its annuities are more closely adjusted to their actual value than those of insurance companies and other parties dealing in annuities can be. However, for the encouragement of the working classes to save and provide for old age and contingencies, the British government, through the savings banks, grants small annuities on terms advantageous to the purchasers—that is, at less than their market value. See SAVINGS BANKS.

Many complicated sets of tables have been prepared to facilitate the calculation of annuities. Among the most esteemed are the *Commutation Tables for Joint Annuities and Survivorship Assurances, based on the Carlisle Mortality at 3, 3½, 4, 5, and 6 per cent.*, by David Chisholm, 2 vols., royal 8vo, 1858. The calculations are brought out in decimals. Taking the simplest of these tables—namely, those containing the value of an A. of \$5, payable at the end of the first year, and thereafter annually during life—we find the following results:

### VALUE OF ANNUITY OF \$5.

| Age. | Amt.    | Age. | Amt.    | Age. | Amt.    | Age. | Amt.    |
|------|---------|------|---------|------|---------|------|---------|
| 5    | \$82.94 | 25   | \$76.50 | 45   | \$63.23 | 65   | \$39.33 |
| 10   | 83.34   | 30   | 73.60   | 50   | 58.55   | 70   | 31.67   |
| 15   | 81.13   | 35   | 70.63   | 55   | 51.98   | 75   | 24.95   |
| 20   | 79.09   | 40   | 66.94   | 60   | 44.69   | 80   | 20.72   |

In political economy, annuities come within the class of payments which tend rather to consumption than to accumulation or reproduction. As the means of attaining a

legitimate object, the establishment of an A. may be an advantage to the community in benefiting some individual member of it. For instance, a man is naturally extravagant—he would spend his heritage immediately, and come to want, if it were paid to him in capital. It is therefore vested in an A.; the man is kept in comfort, and society is not burdened with a needy member. Women not accustomed to business, may mismanage by false investments or otherwise any capital sums left at their disposal, and it is often a protection to give them an equivalent in an A. In serving, however, these legitimate objects, it will be seen that the money so spent is not in its character reproductive. People do save capital out of annuities, but, as a general rule, the object and effect of annuities are in the direction of consumption, not accumulation. This is often overlooked in settlements, especially by men who have themselves been accumulators. The consumptive effect of an A. will depend much on its coming out of fixed or fluctuating property. Take, as an instance of the former, a landed estate. If the clear rent be paid on annuities, the estate will not be improved, and it will be stagnant in the proportion so paid. If, out of \$5,000 a year, \$4,500 be thus paid, the owner, out of his remainder of \$500 is not likely to accumulate sufficient capital to improve the estate and double its value. But fluctuating property may not only be rendered stagnant, but may be destroyed by the burden of injudicious annuities. This is frequently exemplified in disposing of the profits of a business. Different members of a family are portioned off upon it, as if it were a fixed permanent estate; and consequently, there is not a sufficient balance left to induce any one to give his time and energies to the management of the business.

ANNUITY, in Law: a yearly sum of money granted by one party to another in fee for life or years, charging the person of the grantor only. In a less technical sense, when the money is chargeable on land and on the person, it is also generally called an A. An A. is different from a rent charge, with which it is sometimes confounded, in this: a rent charge is a burden imposed upon and issuing out of *lands*, whereas an A. is chargeable only upon the person. An A. may be created by contract, or by will. To enforce its payment, the common law gives a writ of A. which may be brought by the grantee or his heirs, or their grantees, against the grantor and his heirs. The first payment of an A. must be made at the time appointed in the instrument creating it. In cases where a testator directs the A. to be paid at the end of the first quarter, or other period before the expiration of the first year after his death, it is then due; but in fact it is not payable by the executor till the end of the year. When the time is not appointed, as frequently occurs in wills, the following distinction is supposed to exist: if the bequest be merely in the form of an A., as a gift to a man of 'an annuity of one hundred dollars for life,' the first payment will be due at the end of the year after the testator's death. But if the disposition be of a sum of money, and the interest to be given as an A. to the same



## ANNUITY-TAX—ANNUNCIATE.

man for life, the first payment will not accrue before the expiration of the second year after the testator's death. This distinction, though stated from the bench in cases, lacks the emphasis of an express decision.

**ANNUITY-TAX:** a former local impost for the payment of the salaries of the Established clergy of the city of Edinburgh; established 1661; extended 1809; amounting at one time to 6 per cent. on the rents of houses and shops within the royalty. Members of 'the College of Justice,' including the lawyer class generally, were exempt—a relic of an ancient privilege by which they were induced to reside and hold the courts of law in Edinburgh. The tax, which was reduced 1860, was, 1870, redeemed by payment of £56,500 by the Corporation to the Edinburgh Ecclesiastical Commissioners.

**ANNUL**, v. *ăn-nŭl'* [F. *annuler*, to annul—from mid. L. *annulārē*, to annihilate—from L. *ad*, to; *nullus*, none, no]: to reduce to nothingness; to make of no effect; to make void; to abolish. **ANNUL'LING**, imp. **ANNULLED**, pp. *ăn-nŭld'*. **ANNUL'LER**, n. one who. **ANNUL'MENT**, n. the act of making void.—**SYN.** of 'annul': to abolish; abrogate; repeal; revoke; cancel; nullify; reverse; rescind; obliterate; destroy.

**ANNULAR**, a. *ăn'nŭ-lér*, or **ANNULARY**, a. *ăn'nŭ-lér'ŭ* [L. *an'nŭlus*, a ring]: having the form of a ring. **AN'NULARLY**, ad. *-lér-lŭ*. **AN'NULATE**, a. *-lăt*, or **AN'NULATED**, a. *-lăt'ěd* [L. *annulātus*, furnished with rings]: furnished with rings. **AN'NULOSE**, a. *-lōz*, composed of many rings. **AN'NULET**, n. a little ring; in *arch.*, a small fillet or band encircling a column and the like—several times repeated in the molding which surrounds the shaft of a Doric pillar; a small circle in a coat of arms; a charge in Heraldry. **ANNULOIDA**, n. plu. *ăn'nŭ-loj'dă* [Gr. *eidos*, resemblance]: the sub-kingdom comprising Echinodermata and Scolecida. **ANNULOSA**, n. plu. *ăn'nŭ-lō'ză*, the sub-kingdom comprising the Anarthropoda, and Arthropoda or Articulata; in all, the body is more or less composed of a succession of rings. **ANNULAR ECLIPSE**, an eclipse of the sun in which its whole disk is covered by the moon except a bright outer ring.

**ANNULOIDA**, or **ANNULOSA**: see **WORMS**.

**ANNUMERATE**, v. *ăn-nŭ'mér-ăt* [L. *annumērātus*, added or joined to—from *ad*, to; *nu'mēro*, I number]: to add; to place to a former number. **ANNU'MERATING**, imp. **ANNU'MERATED**, pp. **ANNU'MERA'TION**, n. *-shŭn*, addition.

**ANNUNCIATE**, v. *ăn-nŭn'shŭ-ăt* [L. *annunciātus*, made known, announced—from *ad*, to; *nuncio*, I tell (see **ANNOUNCE**)]: to make known; to declare; to bring tidings. **ANNUN'CIA'TING**, imp. **ANNUN'CIA'TED**, pp. **ANNUN'CIA'TOR**, n. *-tér*, one who. **ANNUN'CIA'TION**, n. *-shŭ-ă'shŭn*, the act of announcing: the tidings brought by the angel Gabriel to the Virgin Mary of the incarnation of Christ; also the church festival, Mar. 25, instituted near the beginning of the 7th c. in commemoration of this event,

popularly called in England 'Lady Day' (q.v.). ORDER OF THE ANNUNCIATION, now the highest Italian order; instituted 1362 by the Duke of Savoy, and bearing its present name since 1518, and in 1725 made the first order in Sardinia. The king of Italy is always grand-master.—Two orders of nuns also have borne this name.

ANNUS DELIBERANDI, *ăn'nŭs dē-lĭb'ér-ăn'dĭ*, in Scotch Law: the period of a year allowed to an heir to deliberate whether he would accept the inheritance with the burden of his predecessor's debts. The year commenced on the death of the ancestor, unless in the case of a posthumous heir, when the year ran from the birth of the heir himself. But by a recent act of parliament it is provided that all proceedings against an apparent heir for attaching the ancestor's heritable estate, may be insisted on at any time after the lapse of *six months* from the date of his becoming apparent heir.

ANOBIUM: see BORER: DEATH-WATCH.

ANODE, n. *ăn'ōd* [Gr. *ana*, up; (*h*)*odos*, a way]: term introduced into the science of electro-chemical decomposition (electrolysis) by Dr. Faraday to designate the positive pole, or that surface by which the galvanic current enters the body undergoing decomposition (electrolyte). The negative pole, or that surface by which the current leaves the electrolyte, is called in the same nomenclature the *cathode* [*kata*, downwards, and (*h*)*odos*]. *Electrode* is the general term applied to either of these. The elements of electrolytes are called *ions* [*iōn*, going]. Such as go to the A. receive the name of *anions*, and those passing to the cathode, *cations*. Thus, in the decomposition of water by the passage into it of a galvanic current through two platinum plates, the water is the electrolyte; the platinum plate connected with the copper end of the battery is the A., and the one connected with the zinc end, the cathode. The oxygen and hydrogen which are disengaged are the *ions*; the oxygen separating at the A. is the anion; and the hydrogen at the cathode, the cation. Anions and cations are more generally known under the name of electro-negative and electro positive substances; but as these terms are considered by Dr. Faraday to imply certain supposed attractions for the positive or negative pole, the other terms have been employed by him to describe simply the part the substances play in electrical decomposition.



## ANODON—ANOMALY.

**ANODON**, n. *ăn'ô-dôn*, or **AN'ODON'TA**, n. plu. *-dôn'tă* [Gr. *an*, without; *odous*, or *odon'ta*, a tooth]: the river-mussel, so named as not possessing posterior teeth at the hinge.

**ANODYNE**, n. *ăn'ô-dîn* [Gr. *an*, without; *odünē*, pain]: any medicine that relieves pain: **ADJ.** soothing. Properly, the term is applied to medicines, such as opium, which act on the nervous system, so as to decrease sensibility and induce sleep.

**ANOINT**, v. *ă-noynt'* [Norm. F. *enoindre*, to anoint; *enoint*, anointing—from L. *in*, in; *ungo*, I anoint]: to rub or smear with oil; to consecrate. **ANOINTER**, one who. **ANOINT'ED**, pp.: N. the Messiah: **ADJ.** consecrated. **ANOINT'ING**, imp.: N. the act of smearing with oil: **ADJ.** rubbing with oil. **ANOINT'MENT**, n. the act of anointing.

**ANOINT'ING**: ceremony of pouring an aromatic oil on the head or over the whole body, practiced from the earliest times among oriental nations, and probably first used as a sanative agent in conjunction with the bath. From its observance for the promotion of health and comfort, it gradually came to be esteemed as a token of honor to guests and strangers, and subsequently was adopted as a symbol of consecration. See **CHRISM**: **CORONATION**: **EXTREME UNCTION**.

**ANOMALA**, n. plu. *ă-nôm'ă-lă* [see **ANOMALY**]: irregular words, etc.

**ANOMALISTIC YEAR**, *ă-nôm'ă-lis'tîk*: interval that elapses between two successive passages of the earth through its perihelion, or point of nearest approach to the sun. If the earth's orbit had a fixed position in space, this period would correspond with that of a sidereal revolution, or the time the earth takes after leaving any point of the heavens to return to it again; but the disturbing influence of the other planets causes the perihelion to advance slowly (11'8" annually) in the direction of the earth's motion; so that the A. Y. is longer (4 minutes 39 seconds) than the sidereal. The length of the A. Y. is 365 days, 6 hours, 13 minutes, 49 seconds. It receives its name from the anomaly (q.v.).

**ANOMALY**, n. *ă-nôm'ă-lî*, **ANOM'ALIES**, n. plu. *-ă-lîs*, [Gr. *anom'ălos*, rough, uneven—from *an*, not; (*h*)*omălos*, like to, or similar]: a departure from the common rule; irregularity. **ANOM'ALOUS**, a. *-lîs*, out of rule; irregular. **ANOM'ALOUSLY**, ad. *-lî*. **ANOMALISTIC**, a. *ă-nôm'ă-lis'tîk*, irregular; departing from common or established rules; also **ANOM'ALIS'TICAL**, a. *-tî-kăl*. **ANOM'ALIST**, n. one who.

**ANOMALY**, in Astronomy: the angle measured at the sun between a planet in any point of its orbit and the last perihelion. It is so called because it was in it that the first irregularities of planetary motion were dis-

## ANOMODONTIA—ANONYMOUS.

covered. The anomaly was formerly measured from the aphelion, the opposite point of the ellipse; but from the fact that the aphelia of most of the comets lie beyond the range of observation, the perihelion is now taken as the point of departure for all planetary bodies.

**ANOMODONTIA**, n. plu. *ăn'ō-mō-ădn'shĭ-ă* [Gr. *an'ōmōs*, irregular; *odontā*, a tooth]: in *geol.*, an order of reptiles, also called **DICYNODONTIA**.

**ANOMOPTERIS**, n. *ăn'ō-mōp'tēr-ĭs* [Gr. *an'ōmos*, without rule; *pteris*, fern]: fossil ferns, differing from all recent ones, having the leaves very large and deeply pinnate.

**ANOMOURA** or **ANOMURA**, n. *ăn'ō mō'ră* [Gr. *an'ōmos*, irregular, without rule; *oura*, a tail]: a family of crustaceans characterized by the irregular development of their abdominal segments, as the hermit-crab. **AN'OMOU'RAL**, a. pertaining to.

**ANON**, ad. *ă-nŏn'* [AS. *on an*, in one]: in *OE.*, soon; quickly.

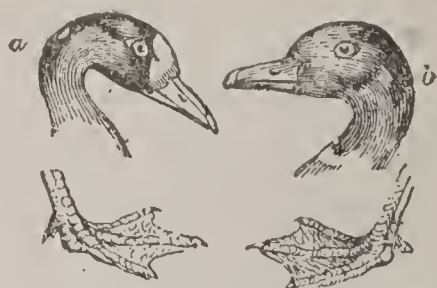
**ANONA**: see **CUSTARD-APPLE**.

**ANONACEÆ**, *ăn-ŏ-nă'sē-ē*: natural order of Dicotyledonous or Exogenous plants, of which the type is the genus *Anona*. They are trees or shrubs, with alternate, simple, generally entire leaves, destitute of stipules; flowers usually green or brown, axillary, solitary, or two or three together; the calyx of 3-4 persistent sepals; the corolla of 6 hypogynous leathery petals, in two rows. The stamens are usually numerous; the filaments short; the anthers adherent, turned outwards, and with a large 4-cornered *connective*. See **STAMEN**. The carpels are usually numerous, separate, or cohering; the styles short; the stigmas simple; the ovules inverted. The fruit consists of distinct or united carpels, sometimes succulent; the seeds attached to the suture; their external covering brittle; the embryo minute, in the base of the hard albumen.—There are about 300 known species, mostly natives of tropical countries. They are generally aromatic and fragrant in all their parts, and some species are employed medicinally; the dry fruit of *Xylopia aromatica* is commonly used as pepper by the African negroes, and was formerly imported into Europe as **ETHIOPIAN PEPPER** or **GUINEA PEPPER**. The flowers of some species are of exquisite fragrance; others yield delicious fruits. See **CUSTARD-APPLE**: **CHERIMOYER**.

**ANONYMOUS**, a. *ă-nŏn'ĭ-mŭs* [L. *anon'ymus*, without a name—from Gr. *a*, without; *onŏma*, a name: F. *anonyme*]: having no name; without the name of the author or writer. **ANON'YMOUSLY**, ad. *-lĭ*. **ANON'YMOUSNESS**, n. the state or quality of being anonymous. **ANONYMITY**, n. *ăn'ŏn-ĭm'ĭ-tĭ*, the state of being without the name of the author or writer; the quality or state of being anonymous.

**ANONYMOUS**: without the name of the author—applied to a book or writing: when an assumed name is given, the term **PSEUDONYMOUS** is used. Works of this class constitute one of the great difficulties of bibliography. French literature possesses an excellent *Dictionnaire des Ouvrages*





Character: of Anseridæ : a, White-fronted Goose (*Anser erythropus*); b, The Tame Goose (*Anser domesticus*).

Anona or Sour-sop (*Anona muricata*).

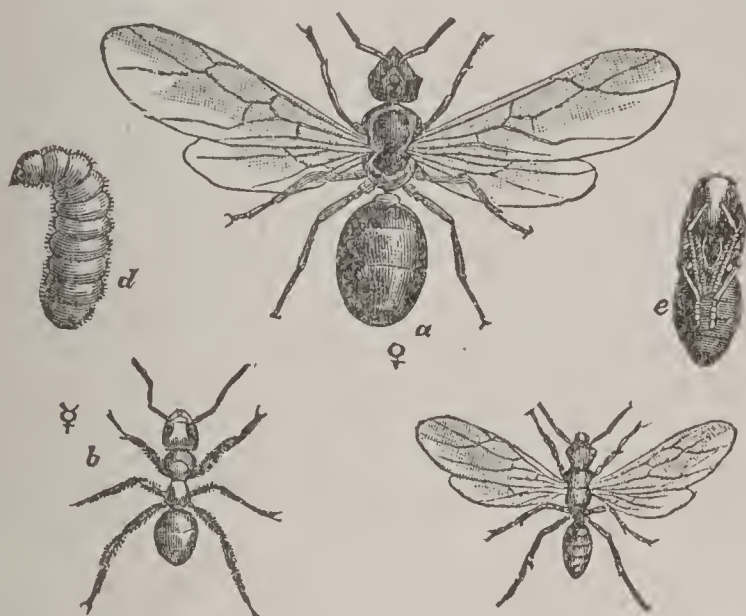


Fig. 1.—A Common Ant (*Lasius flavus*): a, Queen; b, Worker; c, Male; d, Larva; e, Pupa. (After Lubbock.)



Fig. 2.—Part of a Gallery, with Ant working on tip-toe: *Pogonomyrmex molifaciens*, the Agricultural Ant of Texas. (From M'Cook.)

## ANOPLOTHERIUM.

*Anonymes et Pseudonymes* (3d ed., 4 vols., Par. 1872-79) by Barbier, embracing the titles of about 24,000 works, with the names of those who are known or assumed to be the authors. Other lists of A. and pseudonymous literature are found in the indexes to *Notes and Queries*; in 'Olphar Hamst's' *Handbook of Fictitious Names* (1868); Cushing's *Initials and Pseudonyms* (N. Y., 1885), with its companion vol., *Anonyms*, comprising the titles of 20,000 books and pamphlets and authors' names; and Halkett and Laing's *Dictionary of A. and Pseudonymous Literature* (4 vols., Edinburgh 1881-87). It is generally admitted that anonymity secures the independence of the critic; but also it is often a shield to a coward. An instance of the benefit of anonymity (or pseudonymity) was seen in the results of an article in the *Forum* (New York 1887), by 'J. Clay Adams.' An intolerable abuse is the A. letter.

**ANOPLOTHERIUM**, n. *ăn'ō-plō-thē'rĭ-ŭm* [Gr. *a*, without; (*h*)*oplōn*, a weapon; *thērion*, a wild beast]: genus of extinct ungulates, between swine and ruminants, destitute of organs of defense, as tusks, claws, or horns; established by Cuvier from bones occurring in great abundance in the gypsum strata of the Upper Eocene (q.v.) formation, near Paris. They are found also in the same formation in the Isle of Wight, and elsewhere. The teeth differ from those of all other Pachydermata, extinct or recent. There are six incisors, two canines, eight premolars, and six molars in each jaw—the dental formula thus agreeing with that of the fossil genus *Palæotherium* (q.v.); but the teeth are arranged in a continuous series without intervening vacancies—a circumstance very remarkable, as it does not occur in any existing quadruped, but now appears in man alone. The molars of the upper jaw are quadrangular, those of the lower marked with a double or triple crescent of enamel, which forms prominent ridges. In some respects, the teeth resemble those of the *Ruminantia* (q.v.), or ruminating quadrupeds, between which and the *Suida* group the A. has been thought to form a connecting link; but in



Anoplotherium.

some of the species originally included in this genus, and which are now sometimes ranked along with it under the name *Anoplotheroids*, the teeth exhibit peculiarities which have led to the supposition that their food may not have been exclusively vegetable. The snout is not much elon-



## ANOPLURA—ANQUETIL DUPERRON.

gated, and it is evident that there was no proboscis. The feet are terminated by two toes, as in the Ruminantia; but they have always separate metacarpal and metatarsal bones, not a single *canon* bone. A considerable number of species of A. and of Anoplotheroids have been determined, differing in size from that of a small ass to that of a hare, or even of a guinea-pig; so that the smallest species must have been smaller than any hoofed quadruped now existing, or any known to have ever existed. They differ also considerably in general appearance, some having had comparatively long limbs and a light and graceful form, while some were firmly built and heavy. Their habits may be supposed to have differed accordingly. The true Anoplotheria were probably very similar in habits to tapirs. The powerful flattened tails of some are supposed to indicate an adaptation for aquatic life; others have smaller supplemental toes, besides the two hoofs. They form the genera *Dichodon*, *Dickobuné*, *Xiphodon*, and *Microtherium*.

**ANOPLURA**, n. plu. *ăn'ô-plô'ră* [Gr. *anoplos*, unarmed; *oura*, a tail]: name given by Leach to an order of insects called Parasita (q.v.) by Latreille, Cuvier, etc.—part of the *Aptera* of Linnæus—of which the type is the genus *Pediculus* or Louse (q.v.); now ranked under Hemiptera.

**ANOPSIA**, n. *ăn-ôp'si-a*, or **ANOPSY** [Gr. *an*, priv.; *opsis*, sight]: deprivation of sight; sightlessness. In *pathol.*, [Gr. *ana*, upward], upward strabismus; upward squint.

**ANOREXIA**, n. *ăn'ô-rêks'i-ă* [Gr. *an*, without; *orexis*, a longing for, eager desire]: want of appetite; also **ANOREXY**, n. *ăn'ô-rêks-i*.

**ANOSMIA**, n. *ăn-ôs'mi a* [Gr. *an*, priv.; *osme*, smell]: in *pathol.*, state of being deprived of the sense of smell. The synonyms of A. used by medical writers are numerous; e.g., anosmosia, anosphrasia, anosphresia, parosmia, anæsthesia olfactoria, anodmia, etc.

**ANORTHITE**, n. *ă-nôr'thît* [Gr. *a*, without; *orthos*, upright]: one of the felspar family whose cleavages are without right angles. **ANOR'THIC**, a. *-thîk*, pertaining to.

**ANOTHER**, a. *ă-nũth'êr* [*one* and *other*]: one; not the same; any one else.

**ANOURA**, n. *ă-nô'ră* [Gr. *a*, without; *oura*, a tail]: a class of amphibians without tails, as the frog, toad, etc. **ANOUROUS**, a. *-rũs*, destitute of a tail.

**ANQUETIL-DUPERRON**, *ăn-k-têl'-dũ-pêr-rôn'*, ABRAHAM HYACINTHE: 1731, Dec. 1—1805, Jan. 17; b. Paris: oriental scholar. He studied theology, but was attracted to oriental studies, and to gratify his passion for learning, he enlisted as a private soldier for India 1754; but was rescued by friends and enabled, through the royal munificence, to proceed independently. He fixed his residence at Surat, where there was a colony of Parsees, or fire-worshippers, with whose priests he became intimate; and 1762 he returned to Europe, having collected 100 valuable MSS., with other curiosities. The Abbé Barthélemy obtained for him a situation in the Bibliothèque Royale. In 1771 he pub-

## ANSARIANS—ANSELM.

lished his *Zend-avesta*, 3 vols., a literal translation of the *Vendidad*, and other sacred books of the Parsees. This work made an epoch in European knowledge of the doctrines of the ancient Persians, previously drawn from Greek and Roman sources, hostile Mohammedans, and later eastern nations. Unfortunately, A.'s zeal surpassed his patience, sagacity, and mastery of the languages which he translated; and his labors are now largely superseded. Among his works are *Législation Orientale*, 1778; *Recherches Historiques et Géographiques sur l'Inde*, 1786; *Oupnek'hat* (Latin translation of a Persian version of the chief Indian *Upanishads*) 1804.

ANSARIANS, or ANSARIES, or ANSARS: see NOSSAIRI-ANS.

ANSBACH: see ANSPACH.

ANSCHUTZ, *ân'shûts*, KARL: musician 1813, Feb.—1870, Dec. 30. He conducted orchestras in many European cities; and settled in New York 1857, where he successfully organized German opera. He died in New York.

ANSE, *âns*: a name sometimes given to the handles of a cannon. These handles, especially in some foreign cannon, are cast in the forms of dolphins or serpents.

ANSE DE PANIER, *ângs deh pâ nyâ'*: term used in French architecture, designating a particular form of bridge arches; basket-handle shaped.

ANSELM, *ân'sêlm*, of Canterbury: 1033–1109, Apr. 21; b. Aosta, Piedmont: scholastic philosopher. He led at first a dissipated life; and, like Abelard, wandered through France, after the fashion of the scholars of those days, disputing wherever he could find an adversary. Attracted by the reputation of Lanfranc, he went, 1060, to study at the monastery of Bec, in Normandy. Three years afterwards, he became prior, and in 1078, abbot of this monastery, the most famous school of the 11th c. Lanfranc, who in the mean time had gone to England, and become Abp. of Canterbury, died 1089; and the diocese remained four years without a successor, till, 1093, A. was appointed. He was distinguished both as a churchman and a philosopher. His numerous embroilments with William Rufus and Henry I., and the unbending spirit which he displayed in these, even when subjected to banishment, indicate the vigor and resoluteness of his character, as much as his writings exhibit the depth and acuteness of his intellect. In 1720, Clement XI. expressly placed him in the list of church authorities. A. was a second Augustine, superior to all his contemporaries in sagacity and dialectical skill, and equal to the most eminent in virtue and piety. Embracing, without question, the doctrines of the church, mostly as stated by Augustine, and holding that belief must precede knowledge, and must be implicit and undoubting; he yet felt the necessity of a religious philosophy, urged the duty of proceeding from belief to knowledge, and sought to reduce the truths of religion into the form of a connected series of reasonings. It was for this purpose he wrote his *Monologium*



*five Exemplum Meditandi de Ratione Fidei.* In his *Proslogium*, otherwise entitled *Fides quærens Intellectum* (Faith Seeking Intellect), he strove to demonstrate the existence of God from the conception of a perfect being. This ontological proof, however, has never been held satisfactory, though of late there is some indication of a tendency to return to its general line. It is usually considered as assuming at the start the Divine existence which it seeks to prove, or as arguing that because the mind has certain conceptions there exist the realities corresponding. His writings, *Cur Deus Homo* and *De Concordiâ Præscientiæ et Prædestinationis*, made an epoch in Christian philosophy. A. may justly be reckoned the earliest of the schoolmen, although Alexander of Hales (q.v.) was the first who completely systematized in the scholastic manner the doctrines of the Catholic Church. A. was buried at Canterbury. The day of his death is observed in the Rom. Cath. Church. See Rémusat's *Anselme* (1858) and Church's *A.* (1870).

ANSER: see ANAS: GOOSE.

ANSERINE, a. *ăn'sér-în* [L. *anser*, a goose]: of the goose tribe; uneven.

ANS'GAR, or ANSCHARIUS, *an-skā'rĭ-us*: abt. 801–864, Feb. 3; b. Picardy: styled the Apostle of the North, on account of his labors to introduce Christianity into Denmark, Sweden, and Northern Germany. Under the patronage of Louis le Débonnaire, he went, with his colleague Audibert, to preach Christianity among the heathen Northmen of Schleswig, where he suffered many persecutions; but had nevertheless such success that, in 832, the pope established an archbishopric in Hamburg, and A. was appointed the first abp. Here he passed through many difficulties, having to save his life by flight in 845, when the Northmen and Danes under Eric I. plundered Hamburg. He afterwards made several missionary tours in Denmark and Sweden, and d. at Bremen, where a church was named after him. The Rom. Cath. Church has canonized him.

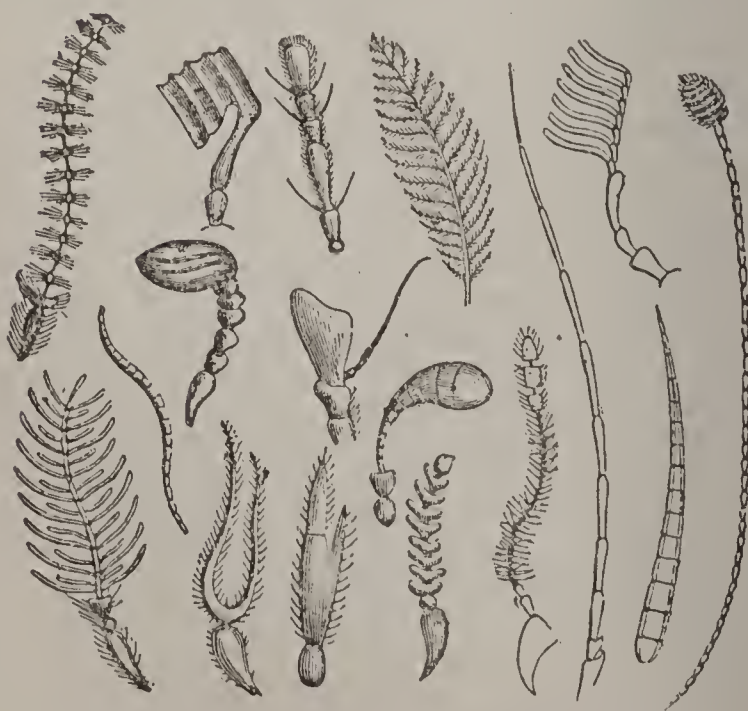
ANSON, *ăn'son*, GEORGE, LORD, Admiral: 1697, Apr. 23—1762, June 6; b. Shugborough, Staffordshire. He early showed predilection for a sea-life. In 1716, he served as second lieut. under Norris; next under Byng in 1718, against the Spaniards; and was made capt. 1723. In 1739, when war with Spain broke out, he was recalled from the Carolina station, on which he had been since 1724, and received the command of the fleet in the South Sea, with instructions to inflict whatever injury he could on the Spanish commerce and colonies, and sailed from England in Sept., 1740. After many misfortunes, he captured several prizes, including a Spanish galleon with a \$2,000,000 cargo. He returned to England 1744, June 15, having circumnavigated the globe in 3 years, 9 months, and greatly extended the knowledge of navigation and geography. He was promoted rear-admiral of the blue 1744, first lord of the admiralty 1751, and admiral of the fleet 1761, and for his victory over the French at Cape Finisterre was created Baron of Soberton.



Ant's Nest (a mound disk) with roads: *Pogonomyrmex molifaciens*, the Agricultural Ant of Texas. (From M'Cook.)



Honey Ant (*Myrmecocystus Mexicanus*): a, natural size. (From Rev. W. Farren White.)



Various forms of Antennæ. (From Roget.)



**ANSO'NIA:** town in New Haven co., Conn.; on the Naugatuck river, the Naugatuck division of the New York New Haven and Hartford railroad, and the New Haven and Derby branch of the Housatonic railroad; 9 m. w. of New Haven, 14 m. n.e. of Bridgeport. There are 5 churches; a high school; a free public library, opened June 1892; one daily and one weekly newspaper; a national bank (cap. \$200,000) and a savings bank; and 3 hotels. There are abundant water supply from the adjacent hills; 2 organized fire-companies, called by electric alarms; an electric street railroad to Derby and Birmingham (the first successful one in New England); and a widely extended system of electric clocks. The fine water-power of the Naugatuck river has been extensively utilized, and beside some of the largest brass and clock works in the country, there are manufactures of machinery, iron, copper, woolen, and electrical goods, and the works of the Postal Telegraph Company. The electric light was introduced at an early period, and experiments conducted here have been very useful in promoting its development. A. was settled about 1845; separated from Derby, and incorporated 1889; and had valuation (1900) \$8,244,983; and debt (1901) \$340,500. Pop. (1890) 10,342; (1900) 12,681.

**ANSPACH**, *āns'pāk*, or, more properly, **ANSBACH:** town of Bavaria, cap. of the circle of Middle Franconia (*Mittel-Franken*); on the Rezat, 25 m. s.w. from Nürnberg. It has manufactures of cotton and half-silken fabrics, tobacco, earthenware, playing-cards, cutlery, and white lead; also a considerable trade in wool, flax, and corn. The situation is pleasant, but there are no remarkable buildings, except the deserted palace of the former margraves of A., surrounded by gardens, and the church of St. Gunibert, said to occupy the site of a church erected in the 8th c., around which the town grew. Pop. over 15,000

**ANSTRUTHER**, *ān'strū-thēr* or *ān'stēr* (EASTERN and WESTER): royal burghs of Fifeshire, Scotland, 9 m. s. of St. Andrews. Pop. of both (1881) 1,842.

**ANSWER**, *v.* *ān'sēr* [*AS. andswarian*—from *and*, against, and *swerian*; Goth. *swaran*, to swear: Icel. *svara*, to answer]: to speak in return; to reply; to be accountable for; to suit; to satisfy, as a claim or a right; to correspond with; to meet or confront: N. something said in reply to a question; correspondence with; retaliation. **AN'SWERING**, imp. **ANSWERED**, pp. *ān'sērd*. **AN'SWERER**, n. one who. **ANSWERABLE**, a. *ān'sēr-ā-bl*, what may be replied to; accountable; responsible; suitable. **AN'SWERABLY**, ad. *-blī*. **AN'SWERABLENESS**, n. *-bl-nēs*, the quality of being answerable. **AN'SWERLESS**, a. without an answer; that cannot be answered.—**SYN.** of 'answer, n.': reply; response; rejoinder;—of 'answerable': responsible; accountable; amenable.

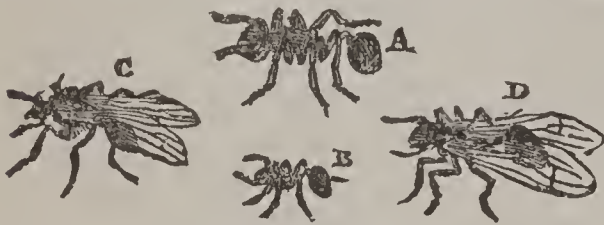
**ANT**, *ānt*, or **ANTI**, *ān'tī* [*Gr.*]: a prefix meaning, against; opposite.

## ANT.

ANT, n. *ānt* [AS. *æmet*]: a small insect; an emmet—of which it is a contracted form. ANT-HILL, a nest of ants. ANT-EATER, a quadruped, having a long snout or muzzle and long tongue, which feeds upon ants. ANT-LION, a small neuropterous insect which preys upon ants.

ANT (*Formi'ca*): Linnæan genus of Hymenopterous insects, now divided into several genera, which form a family called *Formicidæ*. The English name is contracted from *Emmet*, still also occasionally used. Another old English name, not now in frequent use, is *Pismire*. The species are numerous, and are generally distributed over temperate and tropical regions. Their habits and instincts are extremely interesting, and have attracted attention from remote ages.

Ants are small insects, but of extraordinary muscular strength. They carry loads of ten or twelve times their own weight, and have great activity. They have a triangular head; the antennæ are geniculate; the jaws strong; the ligula or lower lip small, rounded, vaulted or spoon-like; the thorax compressed at the sides; the abdomen nearly oval, the pedicle which joins it to the thorax forming in some kinds a single, and in some, a double scale or knot. They live in societies, often very large, which consist, as in bees, of *males*, *females*, and *neuters*. The neuters are females with imperfect ovaries, transformed at an early stage of their existence, and are distinguished into two classes, *workers* and *soldiers*, the former constituting the



*Atta barbara*:

A, one of the larger workers; B, one of the smaller workers; C, a male; D, a female—all natural size.

greater portion of each society, the latter somewhat differing from them in larger size, and larger and more powerful head. The ordinary work of the society is performed by the workers: the principal part in

warfare, defensive or offensive, is taken by the soldiers. The males and females constitute but a small portion of each community. They have delicate glistening wings; but the neuters have no wings, and the thorax is smaller and more compressed. The males are smaller than the females, and the workers are rather smaller than the males. The females and neuters of some kinds (genera *Ponera*, *Myrmica*, *Atta*, and *Cryptocerus*) are armed with stings; other kinds (*Formica* and *Polyergus*) have no sting, but have the power of ejecting a peculiar volatile acid, FORMIC ACID (q.v.), from a small sac in the abdomen; by this means effectually repelling many adversaries, to which the pungent fumes are intolerable. Small animals are soon killed by the vapor of an ant-hill; and a dog has been known to retire yelling from the effect upon his eyes, either of the vapor, or a discharge of the fluid itself. It is said, that when those ants that are unprovided with a sting make use of their mandibles to inflict a bite, they curve



round their abdomen, so as to be ready immediately to squirt this acid into the wound.

The winged ants appear mostly in autumn, and perish before the commencement of the cold weather; a few surviving to found new colonies and perpetuate the race. The neuters pass the winter in large numbers in a torpid state, and resume activity on the return of spring. The nests of ants, after midsummer, are usually found to contain winged males and females mixed with the wingless neuters, which, however, restrain them, and particularly the females, from making their escape into the air, until the pairing season, when they ascend into it in immense swarms, those from many ant-hills sometimes uniting their myriads, rising with incredible velocity in distant columns, and soaring to a great height. 'Each column looks like a kind of slender net-work, and has a tremulous undulating motion. The noise emitted by myriads and myriads of these creatures does not exceed the hum of a single wasp. The slightest zephyr disperses them.' They occasionally, however, make their appearance in such prodigious numbers, that the air is obscured by them. The pairing of ants is supposed to take place in the air. Some of the females which escape destruction by their enemies, or by the elements, found new colonies, in which at first they perform the work usually assigned to neuters. Some, however, are seized by the neuters of ant-hills near which they fall, and there is even reason to think that these go out to search for them; they are stripped of their wings, and forcibly conducted to the habitation, the number of whose inhabitants is to be increased by their multitudinous progeny. They are fed and treated with apparent respect, like the queen-bee among bees; but a society of ants, unlike one of bees, often contains numerous females, each thus treated and equally employed in the important work of laying eggs. Unlike the queen-bees, also, they are invariably denuded of their wings; nor is this always done by the neuters, to prevent their escape, but the female ant, after fecundation, has been seen to denude herself of her own wings, as now superfluous appendages.

The eggs of ants are so small as to be scarcely visible to the naked eye. The mother drops them at random in her progress through the nest; but the workers, of whom some are always in attendance on her, immediately seize them, moisten them with their tongues, and lay them in heaps in particular apartments of the nest. They continue to watch them, and to remove them from one quarter of the nest to another, apparently in order that they may always enjoy a suitable temperature, and perhaps in order to avoid any excess of moisture. In a few days, the young larvæ are produced; and these require the unremitting care of the workers, which feed them, disgorging into their mouths, for this purpose, a viscid substance, supposed to be the ordinary food of the species, prepared for their use by a sort of half digestion. They are also extremely careful to keep the young brood clean, by constant application of their tongue and mandibles; and a great amount of labor is daily

## ANT.

expended upon them, in conveying them from the inner apartments of the nest towards the surface after sunrise, when the weather is fine, and back again before sunset, or when the weather becomes cold, or there is a prospect of rain. The same care is extended to the pupæ. The larvæ and pupæ are the white objects which the workers are seen hastily seizing and carrying off to places of safety, when an ant's nest is broken open; and the resemblance of which, particularly of the pupæ, to grains of barley, is supposed to have contributed to the general belief that ants amass stores of corn for winter food. The larvæ have no organs of locomotion. The pupæ are enveloped in delicate silken cocoons, and unlike those of other insects, require assistance to extricate themselves from them when they have attained their perfect state. This assistance also is afforded by the workers.

The whole supplies of food for the inmates of the nest are brought to it by the workers. The food of some kinds is exclusively or chiefly animal, that of others, vegetable. The provisions carried to their nests by the ants of Britain and other countries in which the winter is cold are apparently not intended for winter, when the creatures are entirely torpid, but only for present use; and few, if any, of the species feed on grain or seeds. But Col. Sykes discovered at Poonah a species of ants (*Atta providens*), which not only store up provisions, but of which the stores consist of the seeds of a species of millet; and Mr. Moggridge has recently determined by careful observation that large stores of grain and seeds are laid up by some of the ants of the s. of Europe, especially *Atta barbara* and *Atta structor*. The grain and other seeds stored up by ants seem, in some way not yet known, to be deprived of the power of germination. The ant has long been a sort of proverbial type, not only of industry, but of provident care for the future. Some ants, however, collect and carry to their nests substances which are not intended for food, but for the construction of the nest, and particularly for closing its apertures in cold or wet weather. In this way they gather together small heaps of chips of wood, bits of straw, small pebbles, etc.

The vegetable substance which ants seem chiefly to use as food is sugar; and to this, wherever it is to be found, they seem to be guided by a very acute sense of smell. *Honey-dew*, the saccharine excretion of the *Aphides* (see APHIDS), is a favorite food of many species; and with this are connected some of their most extraordinary instincts; for not only do they climb the plants on which the aphides abound, that they may obtain this food, but they have been seen to wait beside them for new drops, and even to touch them with their antennæ, in order to cause the drops to flow, patting the abdomen of the aphid on each side alternately and rapidly; the ant, after the drop has been obtained, passing on to another aphid. The whole process has been likened to the milking of cattle. Even more wonderful things are asserted on this subject, as that particular ants seem to regard particular aphides as their own property, and are



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ready to fight in defense of their right to them—that, to secure them for themselves, they convey them from one place to another—and that the *Aphis radicum*, which derives its nutriment from the roots of grass and other plants, is actually kept in large numbers in the nest of the Yellow Ant (*Formica flava*), in order that there may be always at hand a copious supply of food, these aphides and their eggs sharing the solicitude of the ants equally with their own eggs and young. Things so wonderful are ascertained beyond dispute in regard to the instincts of ants, that even such statements as these must not be hastily rejected as incredible, and certainly they express the beliefs of careful and scientific observers.

Ants which feed upon animal food render important service in clearing away every vestige of the flesh of dead animals, and so preventing corruption; and very beautiful skeletons of small animals have been obtained by burying the animal for a short time in an ant hill. But ants also attack living animals: insects of comparatively large size fall a prey to them, and in tropical countries, birds, reptiles, and small quadrupeds are sometimes devoured by their vast swarms, which strip the bones of the animal perfectly clean with wonderful rapidity. Domestic animals, at least when sick, are not safe from them, and man himself regards them with dread. About a hundred years ago, vast numbers of a particular kind of ant (*F. saccharivora*) appeared in the island of Grenada. This species makes its nest under the roots of plants, and the sugar-canes were so weakened and



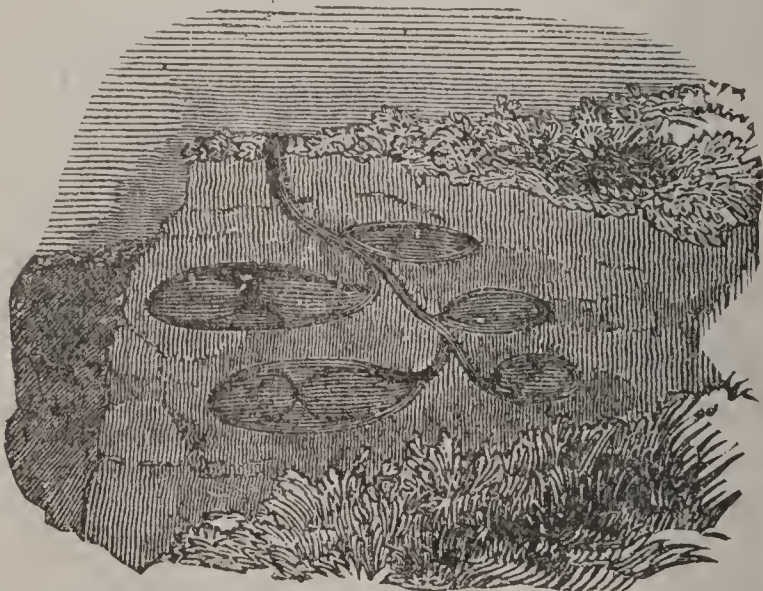
Yellow Ants (*F. Flava*) and Nest.

injured in consequence, that the plantations became nearly unproductive. 'They descended from the hills like torrents, and the plantations, as well as every path and road for miles, were filled with them. Rats, mice, and reptiles of every kind became an easy prey to them; and even the birds, which they attacked whenever they lighted on the ground in search of food, were so harassed, as to be at length unable to resist them. Streams of water opposed only a temporary obstacle to their progress; the foremost

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rushing blindly on certain death, and fresh armies instantly following, till a bank was formed of the carcasses of those which were drowned, sufficient to dam up the waters, and allow the main body to pass over in safety below. Even fire was tried without effect. When it was lighted to arrest their route, they rushed into the blaze in such myriads as to extinguish it.' A reward of \$100,000 was offered in vain for an effectual means of destroying them; but in 1780, a hurricane which tore up the canes, and exposed their habitations to a deluge of rain, freed the island from this plague.

The habitations of ants are very curiously constructed, displaying great ingenuity, although with great diversity in the different species. The greater number of species form their habitations in the ground. These rise above the surface in the form of a dome; hence the name *ant-hills* commonly given them. The largest ant-hills formed by any British species are those of the large red or horse ants (*Formica rufa*), which are sometimes as big as a small haystack; but travellers in S. Amer. describe ant-hills of 15 or 20 ft. in height. The nest of *F. rufa* is outwardly of rude appearance—a confused heap of such portable materials as were within reach; but within, it contains numerous small apartments, of different sizes, arranged in separate stories, some deep in the earth, some above its surface, and communicating with each other by means of galleries. Use is made of the earth excavated from below to mix with other materials in the construction of the upper parts of the fabric. Many species of ants, sometimes called Mason Ants, construct habitations by a still more elaborate masonry, making



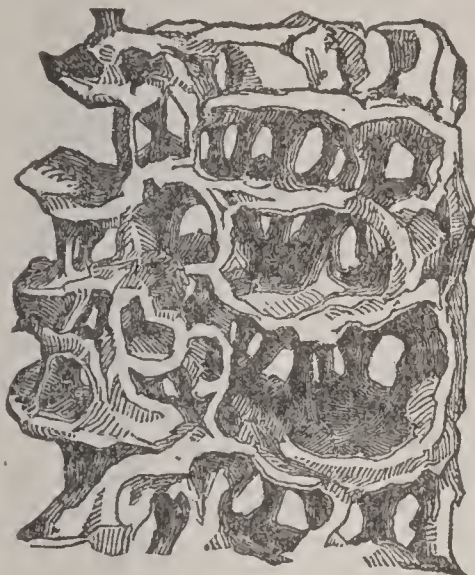
Section of Bank, showing Nests of the Mason Ant.

use, for this purpose, of soft clay, which they spread and mold by means of their mandibles and feet, 'appearing all the while to examine their work by their antennæ. The partition-walls of the galleries and apartments of the *Formica brunnea* are about half a line thick, and about half an inch high; the roofs are somewhat arched, and pillars are frequent in this marvellous architecture. M. Huber saw a



## ANT.

working-ant of another species (*F. fusca*), without assistance, make and cover in a gallery which was two or three inches long, and of which the interior was rendered perfectly concave. There are other species, sometimes called Carpenter Ants, which make their habitations in the trunks



Nest of Carpenter Ant.

an assemblage of apartments and galleries. Some Australian ants form their nests of the leaves of trees glued together, after being first brought into the proper position by the united strength of multitudes.

Of the ants which form their nests in the ground, some, instead of constructing ant-hills, seek the protection of stones, roots of trees, etc. This is the case with some of the British species, and also with the sugar ant of the West Indies, already mentioned.

Many interesting anecdotes are on record illustrative of the instincts of ants, and of the sagacity which they seem to possess. They appear also to have some power of communicating with each other, in which it has been supposed that the antennæ are chiefly employed. Some such power might be supposed to be necessary, if we could venture to reason from analogy upon such a subject, not only to their architectural and other ordinary operations, in which many must take part, systematically and conjointly, but also in their predatory and warlike excursions; for these also some of the species have. If, during the predatory excursions of the *Atta cephalotes* (S. Amer. species), an intervening space occurs which they cannot cross, some of the creatures link themselves together—as monkeys, in like circumstances, have been known to do—forming a bridge over which the main body passes. Ants are, in general, both courageous and pugnacious. Many battles take place among them, both between individuals and large parties; and after a battle, combatants may be found locked in each other's arms, as having died together in the struggle. More extraordinary than anything of this kind, however, is the fact, sufficiently ascertained, that some species of ants go on regular forays to carry off the larvæ and pupæ of certain other species,

of old trees, gnawing the wood into apartments and galleries, with floors and partitions as thin as card. *Formica flava* forms its partition-walls of a sort of *papier-mâché* of sawdust, earth, and spider's web. *F. smaragdina*, an East Indian species, forms its nest of a thin silk-like tissue. *F. bispinosa*, in Cayenne, makes a felt of the down which envelops the seeds of the *Bombax Criba*. An East Indian species, *Myrmica Kirbii*, forms a globular nest of a congeries of tile-like *laminæ* of cowdung, the interior exhibiting

which they carry to their own habitations to rear and employ them as slaves in the work which might be regarded as properly belonging to workers of their own race—a fact to which no other at all analogous has yet presented itself in natural history. The species known thus to make and keep slaves are *Polyergus rufescens* and *Formica sanguinea*, both sometimes called Amazon Ants. It has been noted as a curious circumstance that the kidnappers are red or pale-colored ants, and the slaves jet black. The kidnapping excursions take place only at a particular period of the year, when the nests of the black ants contain the neuter brood. The army of red ants (*P. rufescens*) marches forth, the vanguard, which consists of eight or ten only, continually changing; and on their arriving at the nest of the negro ants, a desperate conflict ensues, which ends in the defeat of the negroes; and thereupon the red ants, with their powerful mandibles, tear open the now undefended ant-hill, enter it, and emerge, carrying the pupæ in their mouths, with which they return in perfect order to their own nest. The pupæ are there treated with great care, and spend their lives among the red ants, excavating passages, collecting food, carrying larvæ, etc., as if this had been their original destination. The amazon ants are not natives of Britain, although plentiful in some parts of Europe.—The Agricultural Ants of Texas are a recent discovery—said to plant, as well as harvest, a species of grass (*Aristida*); and the Honey Ant of Texas sets apart some individuals as living bottles of honey, vastly distended, from which the rest draw supply: see Plate II.

TERMITES (q.v.), or WHITE ANTS, are very different from the true ants, and belong to the order *Neuroptera*. See Lubbock's *Ants, Bees, and Wasps* (1882). See FORMIC.

ANTACID, *ant-äs'id* [Gr. *anti*, against; L. *acidus*, acid]: any substance, as *potash*, *soda*, *magnesia*, *lime*, etc., which counteracts acidity or neutralizes it, especially in the stomach and intestinal canal, by directly combining with the free acid that may be present. The action of antacids is obviously merely temporary, as, unless combined with other medicines, they do not correct the morbid condition which causes the undue acidity; and their too prolonged use must be carefully avoided, since, at all events, some of these medicines, as the alkalies and their carbonates, are liable to induce a state of general anæmia, morbid deposits in the urine, and a series of symptoms not unlike those of scurvy. Antacids are best given in association with vegetable tonics; and for the reasons already stated, their administration must be carefully watched, and should be occasionally omitted. Dr. Neligan makes the following excellent remarks on the particular remedy to be employed for special forms of acidity: 'When the acid exists in the stomach in the gaseous state, ammonia or its carbonates should be preferred, as, in consequence of their volatility, a gaseous acid which would elude the action of the fixed alkalies may be neutralized by them. If the acidity be present in the lower bowel, as in the cæcum or colon, magnesia or lime ought to be administered, as being less likely than the other antacids



to be neutralized or absorbed before it reaches that portion of the intestinal canal. When the acid exists in the urinary organs, the alkalies will be found best adapted, as they have a tendency to act more directly on the kidneys; and when it is *lithic* (or *uric*) *acid* which preponderates in the urine, the preparations of lithia or potash should be preferred to those of soda, as the salts formed by the two former with the acid in question are much more soluble than those formed with the latter. In persons of a corpulent habit of body, potash is to be preferred to ammonia or soda when the use of an alkali is indicated. And finally, ammonia and its preparations are best adapted for the old and debilitated, as also for those of enfeebled constitution.' The antacids include solutions of ammonia, lime (commonly known as lime-water), potash, and soda, various carbonates of these substances, magnesia and its carbonates, and the carbonate and citrate of lithia.

Many of the medicines of this class possess other properties besides that of neutralizing free acids.

ANTÆ: see PILASTER.

ANTAGONIST, n. *ăn-tăg'ô-nîst* [F. *antagoniste*, an antagonist—from Gr. *antagônîs'tēs*, a combatant—from Gr. *anti*, against; *agônîs'tēs*, a combatant]: one who contends with another; an opponent; an enemy. ANTAG'ONISM, n. *-nîzm*, active opposition. ANTAGONIZE, v. *ăn-tăg'ô-nîz*, to act in opposition; to strive against. ANTAG'ONIZ'ING, imp. ANTAG'ONIZED, pp. *-nîzd*. ANTAGONISTIC, a. *ăn-tăg'ô-nîs'tîk*, striving against. ANTAG'ONIS'TICALLY, ad. *-nîs'tî-kăl-î*. ANTAG'ONIS'TIC FORCES, two powers in nature, the one counteracting the other, as fire and water.—SYN. of 'antagonist': an adversary; enemy; opponent; foe.

ANTALCIDAS, *ăn-tăl'sî-dās*: a Spartan statesman, who in the earlier part of the 4th c. B.C. was conspicuous in a very perilous crisis of the history of his nation by his skilful policy. Some time after the Peloponnesian War, it seemed as if Athens were destined to regain the supremacy she had lost. The Greek states rallied round her; while Conon, an able and vigilant Athenian admiral, and his ally, Pharnabazus, the Persian, were everywhere victorious in their naval encounters with the Spartan fleet. It became necessary, therefore, that communications should be entered into with the Persian king, from whom the confederate Greeks drew their chief resources. A. was chosen ambassador to Tiribazus, satrap of w. Asia. On hearing this, the Athenians grew alarmed, and sent Conon to frustrate the schemes of the former; but Tiribazus took A.'s part, and the result was that Conon was thrown into prison, and A. secretly received money to enable Sparta to continue the war. At first, Artaxerxes, the Persian monarch, was dissatisfied with the conduct of his satrap, recalled him, and put Struthas, a friend of Athens, in his place; but through a complication of circumstances, A. was subsequently completely successful in securing the good-will of Artaxerxes. He was then appointed admiral of the Spartan fleet, and assisted by Tiribazus, Ariobarzanes, etc., swept

## ANTALGIC—ANTAR.

the seas until Athens became desirous of peace. For various reasons, so was Argos; also Sparta. Tiribazus therefore assembled deputies from the Greek states, and, in the name of his master, Artaxerxes, read the famous declaration or treaty of peace, to which all the members present agreed, and which is known in history under the name of 'the Peace of Antalcidas,' as being the result of the latter's able diplomacy. Its three great points were as follows: 1. That all the Greek towns on the mainland of Asia Minor, together with the islands Clazomene and Cyprus, should remain under the protection of the Persian king. 2. That all other Greek towns, large and small, should be independent; but that the islands of Lemnos, Imbros, and Scyros should belong to Athens. 3. That war should be declared against whatever state refused to accept these points. After this peace, the history of A. becomes doubtful and obscure. He seems to have lost favor with the Persians, and Plutarch even leads us to suppose that, sickened by misfortune and the loss of reputation, he starved himself to death; but this story is not credited by scholars, both on account of its intrinsic improbability and its apparent disagreement with the statements of other writers.

**ANTALGIC**, a. *ănt-ăl'jĭk* [Gr. *anti*, against; *algos*, pain]: applied to that which can assuage pain.

**ANTANACLASIS**, n. *ănt-ăn'ă-klă'sĭs* [Gr. *anti*, *anaklasis*, a bending back and breaking]: in *rhet.*, a figure which consists in repeating the same word in a different sense; as, whilst we *live*, let us *live*. In *gram.*, a repetition of words, beginning a sentence, after a parenthesis; as, 'shall that heart (which not only feels them, but which has all motions of life placed in them) *shall that heart*,' etc.

**ANTANANARIVO**, *an-tă-nă nă're-vô'*, or **TANÀNARĪVO**: cap. city of Madagascar; on a hill, in an undulating district, 5,000 ft. above the level of the sea. It is exposed to fearful thunder-storms. The approach to it from Tamatave, the chief seaport, is extremely tedious and difficult, owing to the want of roads. It is nevertheless the seat of considerable trade and industry. The royal palace occupies the summit of the hill; adjoining are the dwellings of the chief officers of government; and below these, covering the slope of the hill, and built on terraces, are the houses of the other inhabitants, constructed of mud and sun-dried bricks. The people have considerable aptitude for civilized usages; and, thanks to missionary enterprise, considerable progress has been made towards the adoption of European habits.—See the works on Madagascar by Mulsens (1875) and Grandidier (1876); also *Three Visits to Madagascar* (1858) and *Madagascar Revisited* (1867) by Ellis. In the latter work will be found a plan of the city, showing the missionary churches, chapels, dispensary, hospital, etc., and views of the principal houses. Pop. estimated 80,000.

**ANTAR**, *ăn'tar*, or **ANTARA**, *ăn'tă-ră*: celebrated Arab chief of the 6th c., one of the seven poets of Arabia, whose prize-poems, embroidered in golden characters on a silken ground, were hung up on the gate of the Caaba, and thence



## ANTARCTIC—ANTARCTIC OCEAN.

called *Moallakat*—i.e., the Suspended. In his poem that has descended to our day, he paints his warlike deeds, and his love for Abia. His courage and heroism during a forty years' warfare between two Arab tribes, and his constancy in love, were long dear to the memory of his countrymen, and appear to have formed the groundwork of the voluminous romance called *Antar*, commonly ascribed to Asmai, and reduced to writing as early as the days of the Caliph Haroun-al-Raschid, in the 8th c. This work, which has come down to us in a later and much corrupted form, gives an attractive and faithful picture of Bedouin life, and is rich in epic interest, although too monotonous to satisfy the taste of the European reader. In the East, however, it still supplies the favorite themes of the professional story-tellers who haunt the coffee-houses. A poetical translation of it into English was made by Terrie Hamilton, 1820.

ANTARCTIC, a. *ánt'árk-tík* [Gr. *anti*, opposite; *arktos*, the constellation of the Bear]: opposite to the northern or Arctic pole; a circle about  $23\frac{1}{2}$  deg. from the s. pole.

ANTARCTIC OCEAN, or SOUTHERN OCEAN: the sea round the south pole, as the *Arctic Ocean* round the north. It comprises all the sea to the s. of the Atlantic, and the Indian, and the Pacific oceans. In this view, the A. O.'s northern limit may be conveniently divided into three straight lines—the *first* between Cape Horn in S. Amer. and Cape Agulhas in Africa; the *second*, between Cape Agulhas and the s. extremity of the Auckland Islands as an appendage of New Zealand; and the *third*, between the s. extremity of the Auckland Islands and Cape Horn. This appears to form the true boundary of the polar regions of the s. hemisphere. The most northerly isles which it incloses are New Georgia, at the mouth of the Atlantic, and Kerguelen's Land, at the mouth of the Indian Ocean. The latter tells its own story in its other title of 'The Island of Desolation;' and the former presented to Cook, even in the middle of summer, perpendicular cliffs of ice, and valleys covered with everlasting snow.

It is usual, indeed, to define the Antarctic Ocean and the corresponding ocean to the n., as being contained each within its own polar circle. But, with regard to both oceans alike, this definition appears to be inadmissible. It is only at two points—the head of the Pacific and the head of the Atlantic—that the Arctic Sea can possibly reach the Arctic Circle at all; while, in point of fact, it overlaps it at Behring's Strait by nearly a degree, and falls several degrees short of it between the n. half of Norway and the s.e. shore of Greenland. The A. O., again, is nowhere practically limited by the definition in question: not a single voyager hesitates to use the expression long before he arrives at lat.  $66^{\circ} 30'$  s., nor is a single authority consistent in the use of the arbitrary nomenclature.

The A. O. has been explored, more or less satisfactorily, by various navigators, as far as  $79^{\circ}$  s. With a few exceptions, however, little of it is accurately known, the difficulties and dangers of its navigation rendering thorough and

## ANT-BEAR—ANT-EATER.

continuous investigation almost impracticable. The names that may be found in their proper places are New Georgia, Kerguelen's Land, Sandwich Land, New South Shetlands, New Orkneys, Enderby's Land, Graham's Land, Balleny, Sabrina, and Victoria Land.

Taken as a whole, these lands bear a very small proportion to the extent of an ocean which embraces half the latitudes and all the longitudes of the s. hemisphere, exceeding its kindred sea to the n., as a glance at the map will show, by nearly half of Asia and N. Amer., and the whole of Europe. Such of these lands as are really accessible at all times have been more or less valuable in connection with the whale and seal fisheries.

The features of the A. O. itself, briefly stated, are constant fogs, baffling currents, innumerable icebergs, and magnificent manifestations of the Aurora Australis. On the coast of Victoria Land, beyond the parallel of  $70^{\circ}$ , two mountains have been observed to be of a height altogether unequalled in such a latitude—Mt. Terror, 10,000 ft., and Mt. Erebus, 12,400. The latter is a volcano, being, it is apprehended, the only phenomenon of the kind in either of the frigid zones.

Of the two circumpolar oceans, the southerly one has excited much less interest than the northerly. The open passages round the two capes respectively into the Indian Ocean and the Pacific, have, from the very beginning, rendered unnecessary any such voyages as those which, for nearly three centuries, have developed so much patience and fortitude in the heroic explorers of the Arctic shores.

ANT-BEAR: see ANT-EATER.

ANT-CATCHER, and ANT-THRUSH: birds of tropical and sub-tropical countries, which feed chiefly upon ants. They are closely allied to the Thrushes (see THRUSH), and are included with them in the family *Turdidæ* or *Merulidæ* of recent ornithologists. They are distinguished by a straight sub-cylindrical strong bill, hooked at the tip, slender legs, and very short tails. They form the genus *Myiothra* of Illiger, now subdivided into several genera, one of which, *Pitta*, contains the *Brèves* of Buffon—birds of brilliant plumage, natives of s.e. parts of Asia and the Malayan archipelago. The true ant-catchers are mostly American, are of comparatively sober plumage, live among the huge ant-hills, seldom fly, and are remarkable for their sonorous voices, the power of which in some species is extraordinary. The largest species, known as the *King of the Ant-catchers* (*Grallaria Rex*), is about the size of a quail. Its legs are remarkably long.

ANTE, *ān'tē* [L.]: a prefix meaning *before*, either in time or place.

ANT-EATER (*Myrmeco'phaga*): genus of S. Amer. quadrupeds belonging to the natural order *Edentata*. The species are few. They are perfectly toothless, their food being insects, and particularly ants, which they procure in great numbers by thrusting among them a very long cylindrical tongue, covered with a viscid saliva, and then retract-



## ANT-EATER.

ing it into the mouth. The head is remarkably elongated, with a slender muzzle, and a small mouth. The tongue is doubled up in the mouth when not in use for catching prey. The ears and eyes are very small. The toes differ in number in



Great Ant-eater (*M. Jubata*).

the different species, but are united as far as the base of the claws, which are very large and strong, adapted to tearing up the habitations of ants. The great A.-E. (*M. Jubata*), a native of the warm parts of S. Amer., and called in Demerara the Ant-bear, is about 4½ ft. in length from the snout to the origin of the tail, which is more than two ft. long, and is covered with very long hair. The body is also covered with long hair, particularly along the neck and back. There are four claws on each of the fore-feet and five on the hind ones. The A.-E. spends much of its time in sleep, the long snout concealed in the fur of the breast, the hind and fore claws locked together, and the bushy tail thrown over all, as if for a shade from the sun. It is very unsocial in its habits, and is regarded as very stupid. It has great strength in its fore-legs and claws, and is said to hug like the bear, so as to crush an enemy to death. The female produces one young one at a birth, and carries it about for some time on her back.—Another species, the Tamandua (*M. Tamandua*), having the same number of claws, has a less elongated snout, comparatively short hair, and a prehensile tail, is scarcely as large as a cat, and climbs trees in quest of its insect food.—The Little or Two-toed A.-E. (*M. didactyla*) differs from these species not only in the number of its toes, but in other anatomical characters.—Closely allied to this genus in structure and habits is the genus *Manis*, containing the PANGOLINS of Africa and India; but instead of hair, the body is covered with strong horny scales. See PANGOLIN.—The name A.-E. is given at the Cape of Good Hope to the *Orycteropus Capensis*, the Aard-vark or Earth-hog of the Dutch colonists, a quadruped of about the same size with the great A.-E. of America, belonging to the same natural order, and resembling it also in its elongated muzzle and extensile tongue, which it employs in the same way, but provided with grinding teeth and flat claws adapted for burrowing. It burrows with extraordinary facility, and it is in this way that it seeks to secure its safety when assailed. It has very short hair, and little of it. The ears are moderately long. It is a nocturnal animal, and very timid.—The *Echidnæ* of New Holland are sometimes called Porcu

## ANTECEDE—ANTELIOS.

pine Ant-eaters, from their food, and their similarity to the true ant-eaters in their sharp muzzle and extensile tongue; but they differ much in some parts of their structure. See ECHIDNA.

ANTECEDE, v. *ăn'tě-sěd'* [L. *antēcēdērē*, to go before—from *ante*, before; *cedo*, I go]: to go before in time. AN'TECE'DING, imp.: AN'TECE'DED, pp. AN'TECE'DENT, n. -*sě'děnt*, that which goes before in time or place: ADJ. going before in time or place. AN'TECE'DENTLY, ad. -*lě*. AN'TECE'DENCE, n. -*děns*, or AN'TECE'DENCY, n. -*sě*, the act or state of going before in time. AN'TECE'DENTS, n. plu -*děnts*, the previous life and character of a person. AN'TECES'SOR, n. [L. *ante*, *cessus*, gone]: one who lived or possessed before another.—SYN. of 'antecedent, a.': precedent; preceding; foregoing; previous; anterior; prior; former.

ANTECEDENT: a term in Logic, Grammar, and Mathematics. Thus in Logic, a proposition from which another is deduced, or a general principle which serves as the base and support of some particular proposition, is called the A. In Grammar, the A. is the word which precedes the relative—e.g., 'The *man* who dies for his country should be held in honor': here 'man' is the A. In Mathematics, the A. of a ratio is the first of two terms which compose the ratio; thus, in the ratio of 4 to 3, 4 is the A. The word is also used in the plural in a peculiar sense. 'We know very little of his *antecedents*'—i.e., of his previous character or conduct.

ANTE-CHAMBER, n. *ăn'tě-chām'běr*, or ANTE-ROOM, n. [L. *ante*, before]: a room to be passed through to a principal room.

ANTECIANS, n. plu. *ăn'tě'shĭ-ănz*, or ANTÆCI, n. plu. *ăn-tě'sĭ* [Gr. *anti*, against; *oikēō*, I dwell]: those who live in the same latitude and longitude, but on different sides of the equator.

ANTEDATE, v. *ăn'tě-dăt* [L. *antē*, *datus*, given]: to date before the true time. AN'TEDA'TING, imp. AN'TEDA'TED, pp.

ANTEDILUVIAN, a. *ăn'tě-dĭ-ló-vĭ-ăn*, or ANTEDILUVIAL, a. -*vĭ-ăl* [L. *ante*, *dilu'vĭum*, a deluge]: existing or happening before the flood of Noah. AN'TEDILU'VIAN, n., one who lived before the flood. The A. ages are those which elapsed before the flood, and, in theological language, the A. religion means the religion of the patriarchs from Adam to Noah. In Geology, the 'A. period' has no reference to the deluge recorded in the Mosaic narrative, but only to the latest transformation of the earth by means of water.

ANTELIOS, a. n. *ănt-ě'lĭ-ōs*: opposite or over against the sun; another spelling ANTHELIOS. See ANTHELION.



## ANTELOPE

ANTELOPE, n., *ăn'tě-lōp* [F. *antilope*—from Gr. *antho-*  
*lops*—from *anthos*, beauty; *ops*, the eye]: genus of *Mammalia*  
 belonging to the order of Ruminants (q.v.), and to the hol-  
 low-horned section of that order—in which the horns consist  
 of an elastic sheath surrounding a bony process of the skull,  
 and are permanent, not annually renewed. The antelopes  
 have the bony nucleus of the horns solid, not occupied, as  
 in those of goats, sheep and oxen, to a considerable extent,  
 with cells communicating with the frontal sinuses. They  
 are also distinguished from the allied genus of goats by hav-  
 ing the chin beardless, and from them and sheep by the  
 horns not being longitudinally angled or ridged. The horns  
 of antelopes are, however, very generally annulated, or sur-  
 rounded with thickened rings. The body is slender and  
 deer-like, the feet small and elegant, the tail short and tuft-  
 ed, the hair generally short, and the color often lively.  
 Some species, however, have comparatively long hair; and  
 a few which inhabit cold mountainous regions are clothed  
 with wool intermixed with longer and coarser hair, particu-  
 larly the CHAMOIS (q.v.) of the Alps, Caucasus, etc.; the  
 ROCKY MOUNTAIN GOAT (q.v.) of N. Amer., and the  
 CHIRU (q.v.) of the Himalayas. Many species have infra-  
 orbital sinuses or *tear-pits* like DEER (q.v.). The females  
 of many species, as of deer, are destitute of horns; and if  
 they alone came under observation, it would be difficult to  
 say to which genus they belonged. The size is very various;  
 the Guevei or Pigmy A. of Africa (*A. pygmæa*) is only 8 to  
 9 inches high at the shoulder, while the largest species  
 measure 5 or 6 feet. Almost all the species of antelopes are  
 peaceable, timid animals, and are distinguished by their  
 agility and fleetness. Most of them are gregarious. Some  
 inhabit plains; other are found only in the most inaccessible  
 mountainous regions; others dwell in jungles and deep for-  
 ests. N. Amer. possesses two or three species, which depart  
 considerably, as does also the chamois of Europe, from the  
 typical character of the genus. Europe produces only the  
 Chamois and the Saiga (*A. Saiga*), the *Colus* of Strabo,  
 which inhabits the s. plains of Poland and Russia. Asia  
 has a greater number of species; but they are most numerous  
 in Africa, and particularly in s. Africa. The known spe-  
 cies amount to more than eighty, which are arranged in  
 sections or groups according to the peculiarities of the horns  
 and other characters, but a satisfactory classification of them  
 is difficult. Now naturalists make a family of *Antilopæ*,  
 and subdivide it into genera, for they can be separated by  
 sufficiently marked characters. The flesh of all antelopes  
 is used as food; hence they are much objects of the chase.  
 They furnish also great part of the subsistence of beasts of  
 prey in Africa, where some of the species exist in such num-  
 bers that, particularly when severe drought occurs in the  
 regions which they ordinarily inhabit, dense and multitu-  
 dinous herds occasionally appear in the interior of Cape Col-  
 ony, to the terrible devastation of the crops. Even the  
 saigas of the Tatarian plains congregate in herds of many  
 thousands in the end of autumn.

The name A. is sometimes more particularly restricted to

## ANTELOPE.

a species also known as the Common or Indian A., and as the Sasin. It is a native of India and the eastern parts of Asia, and is a beautiful animal, about  $2\frac{1}{2}$  ft. high at the shoulder, with erect, diverging horns, bent in a spiral of two or three turns. The hair is uniformly short, except that, as in many other species of A., there are small tufts of bristles on the knees. It inhabits open plains, and the herds exercise great watchfulness. Its fleetness is such that grayhounds chase it in vain; and it can easily bound over an inclosure of 11 ft. in height, or over a distance of 10 or 12 yards. The flesh is held in small esteem, and the animal is less than many of its congeners an object of the chase.—The Saiga is a much less graceful animal; its horns are short, and, as in many of this genus, curved first outwards and then inwards, so that the whole outline formed by them resembles that of a lyre. The horns are used by the Russians and Chinese for the manufacture of many articles of domestic economy; and it is chiefly for their sake and that of the skin that the saiga is hunted, the flesh having a disagreeable taste, ascribed to the saline and aromatic plants of the steppes.—The Dzeren (*A. gutturosa*), sometimes called



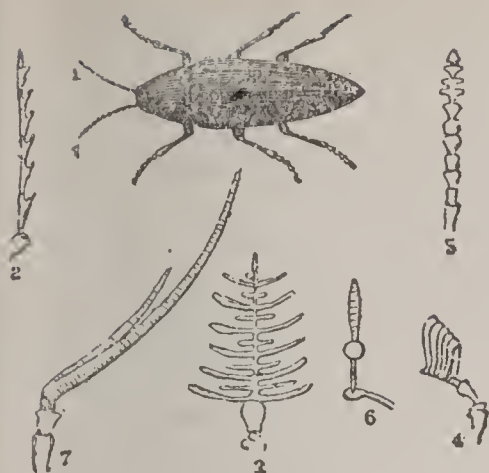
Addax (*A. Addax*).



Head of Antelope Chikara.

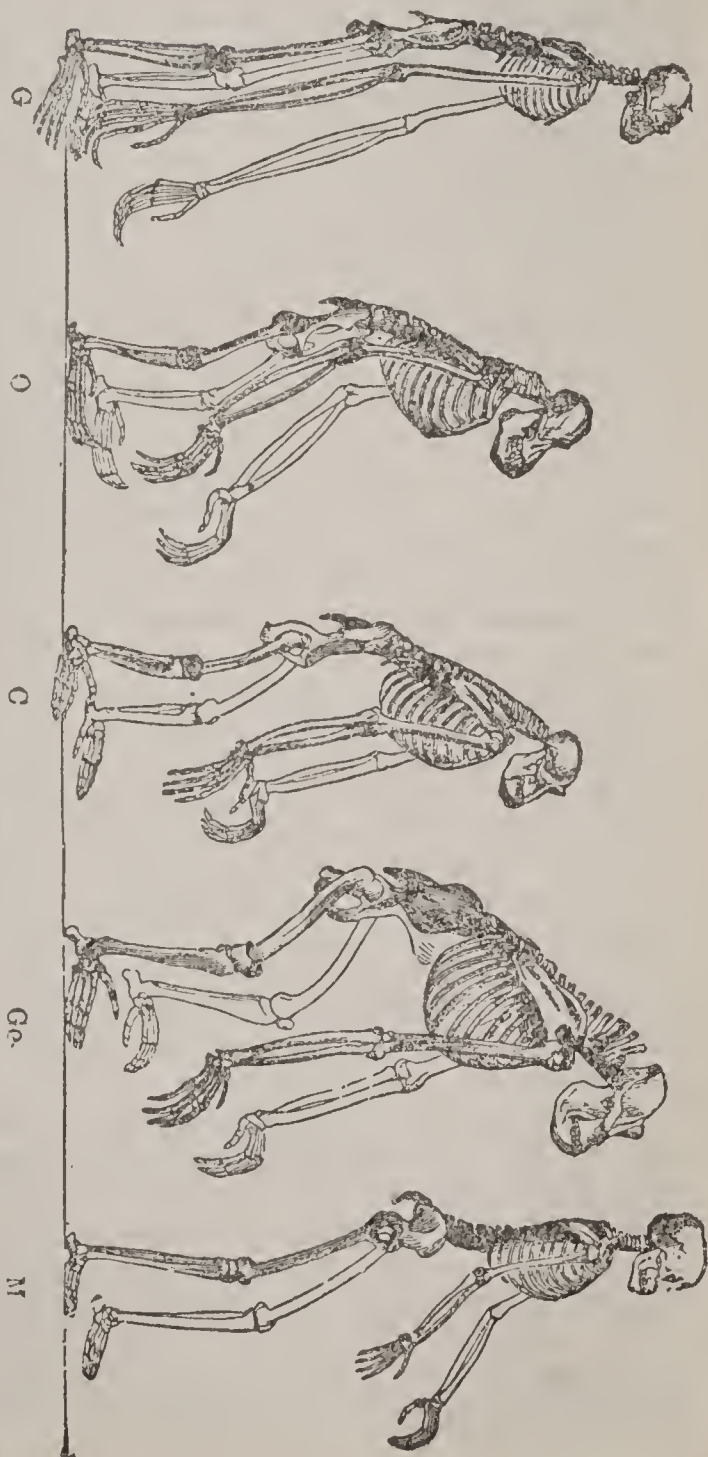
the Chinese A., and known among the Chinese by a name which signifies the Yellow Goat, is an inhabitant of the arid deserts of Central Asia, the flesh of which is highly esteemed, and which is therefore a chief object of the chase in these regions. It derives its specific name from a large movable goitre-like protuberance on the throat of the old males, produced by a dilatation of the larynx.—The Addax, or Nubian A. (*A. Addax*), known to the ancients, and mentioned by Pliny, has horns very similar to those of the Indian A., but is a larger animal, less graceful, with a slight mane on the neck, a tuft of long hair on the forehead, and large broad hoofs adapted for treading on fine and loose sands. It inhabits the deserts of Central Africa, and, contrary to the usual habits of the genus, is said not to be gregarious but to live in pairs. The Chikara and some other Indian species are distinguished by two additional rudimentary horns in front of the ordinary horns, and im-





**Antennæ.**—1, 1, Filiform Antennæ of Cucujo Firefly of Brazil (*Pyrophorus luminosus*); 2, Denticulate Antenna; 3, Bipinnate; 4, Lamellicorn; 5, Clavate; 6, Geniculate; 7, Antenna and Antennule of Crustacean.

Skeletons of **Anthropoid Apes** compared with that of Man; G, Gibbon (for distinctness, given about twice the proportional size); O, Orang-utang; C, Chimpanzee; Go, Gorilla; M, Man. (After Huxley.)



b, b. Anthers.

## ANTELUCAN—ANTE-NICENE.

mediately over the orbits. The chikara inhabits thick forests and jungles. Like the addax, it lives in pairs; as do also the Stein-boc (q.v.) of s. Africa, an extremely graceful species; and the Kleene-boc of the same country (*A. perpusilla*), a beautiful and active little creature, with very small horns. The kleeneboc is of a mild and gentle disposition, and extremely capable of domestication. The Gazelle (q.v.) of n. Africa (*A. Dorcas*), one of the species known to the ancients, is very frequently domesticated; and from its gracefulness of form, its gentleness of manners, and its bright black eyes, has afforded to the Arabian poets one of their most favorite objects of comparison. The s. African SPRING-BOC (q.v.) is another very beautiful species, and is frequently domesticated by the colonists at the Cape of Good Hope. Among the numerous species which that country produces may be mentioned also the Blauw-boc (*A. leucophæus*); the Riet-boc (*A. arundinaceus*); and the Kaffrarian ORYX (q.v.), (*A. Oryx*), which somewhat resembles, but is quite distinct from, the Oryx of the ancients (*A. Leucoryx* or *A. Gazella*), also called the Algazel, a native of the countries on both sides of the Red Sea. Still more worthy of notice among the s. African species, but in some measure departing from the strict A. type, is the ELAND (q.v.), the largest of all the antelopes—an animal which may yet probably be found very valuable in domestication. The KUDU (q.v.) is another noble species, allied to the eland. The NYL-GHAU (q.v.) of India, and the GNU (q.v.) of s. Africa, are also among the largest antelopes, but depart still further from the generic type, particularly the latter, so that a separate genus (*Catoblepas*) has been constituted for it, having better claims to be recognized than the other genera into which it has been proposed that the antelopes should be divided. Less different from the ordinary type, but still with a marked approach to a bovine appearance, are the BUBALUS (q.v.) of the ancients, a native of the n. of Africa, the Arabic name of which signifies wild ox, and the KAAMA (q.v.) or Harte-beest, of the Cape of Good Hope, which is nearly allied to it. The PRONG-HORN (q.v.) and the ROCKY MOUNTAIN GOAT (q.v.) are the best known N. Amer. species, and both are found only in the w. parts of the continent. It has been proposed to introduce the latter, as a wool-bearing animal, into the Highlands of Scotland. The Pronghorn sheds its horns.

**ANTELUCAN**, a. *ăn'tě-ló'kăn* [L. *antēlucā'nus*, that takes place before daylight—from *ante*, *lux* or *lucem*, light]: before the dawn or daylight.

**ANTE-MERIDIAN**, a. *ăn'tě-mě-řid'ĩ-ăn* [L. *ante*, *merid'ies*, mid-day]: before noon or twelve o'clock. **POST-MERID'IAN**, after twelve o'clock.

**ANTE-MUNDANE**, a. *ăn'tě-mŭn'dăn* [L. *ante*, *mundus*, the world]: before the creation of the world.

**ANTE-NICENE**, a. *ăn'tě-nĩ'sēn* [L. *ante*, before; *Nicœa*, Nice, a city of Asia Minor, at which the Nicene Creed was promulgated by a general council held there, A.D. 325]: anterior to the first council of Nice.



## ANTENNÆ-ANTERIOR.

**ANTENNÆ**, n. plu. *ăn-těn'nē* [L. *antenna*, a sail-yard]: the feelers or horns of insects, crustacea, etc. **ANTEN'NAL**, a. pertaining to. **ANTENNULES**, n. plu. *ăn-těn-ŭlz*, applied to the smaller pair of antennæ or feelers in the crustacea.

**ANTENNÆ**, in Zoology: jointed filaments with which the heads of Insects, Crustacea, and Myriapoda are furnished, and which are evidently very delicate organs of touch. They are therefore sometimes called feelers. The A. are placed on the anterior or superior part of the head; the animals appear to feel their way with them, and to them is ascribed the bee's power of working in the dark. Some suppose that they are also organs of hearing, and by means of them it appears that many insects, as bees and ants, have the power of communicating with one another. They have great flexibility, but differ very much in the number of joints which they contain (amounting sometimes even to 100), in the relative length and thickness of their joints, and also in their form, being filiform or thread-like, clavate or club-shaped, feathered, etc., in endless variety.

**ANTENUPTIAL**, a. *ăn'tě-nŭp'shăl* [L. *ante*, *nuptiæ*, marriage]: before nuptials or marriage.

**ANTE-PASCHAL**, a. *ăn'tě-păs'kăl* [L. *ante*, and *paschal*]: pertaining to the time before Easter.

**ANTEPAST**, n. *ăn'tě-păst* [L. *ante*, *pastus*, fed]: a fore-taste.

**ANTEPENDIUM**, n. *ăn'tě-pěn'dĩ-ŭm* [L. *ante*, before; *pendĕo*, I hang on]: in *R. Cath. Ch.*, a covering for the front of the altar—red, purple, etc., according to the color of the vestments for the mass of the day.

**ANTEPENULT**, n. *ăn'tě-pě-nŭlt'* [L. *ante*, before; *penĕ*, almost; *ultimus*, last]: in a word, the last syllable but two.

**ANTEPENULTIMATE**, a. *-pěn-ŭl'tě-măt*, pertaining to the last syllable but two.

**ANTEQUERA**, *ăn-tă-kă'ră* (*Antiquaria* of the Romans): important town in the province of Malaga, Spain; in a fertile plain, 45 m. w. of Granada. The inhabitants are engaged chiefly in agricultural operations, but also manufacture baize, silk, cotton, and paper. They are noted for their love of bright colors in dress. Although A. is clean and well built, it is rarely visited by travellers, being considerably off the high road. As late as 1544, the place possessed, in almost perfect condition, an ancient palace and theatre; but about that time the stones were plundered to build a convent, and only a few were spared, now imbedded in the walls of the town. A., like all the other cities of s. Spain, was for a while in the hands of the Moors; but in 1410 it was retaken by the regent Fernando, hence called *El Infante de A.* When the French took the place, during the Peninsular War, they converted a curious old mosque—a relic of Moorish sway—into a storehouse, and on their departure carried off with them the magnificent Moorish armory. Pop. 25,550.

**ANTERIOR**, a. *ăn-tě'rĩ-ér* [L.]: before in time or place; previous; in front. **ANTE'RIORLY**, ad. *-lĩ*, in an anterior

## ANTHELION—ANTHEM.

manner; before. ANTE'RIOR'ITY, n. -ī-tī, state of being before; priority.—SYN. of 'anterior': preceding; antecedent; foregoing; former; previous; prior; precedent.

ANTHELION, n. *ānt-hēl'yŭn* [Gr. *anti*, over against; *hēlios*, the sun]: a bright spot or glory of light seen opposite the sun; sometimes seen around the head of his shadow, or a mock sun. ANTHE'LIA, n. plu., also called 'glories of light;' luminous rings, seen by an observer on a cloud or fog which lies opposite to the sun. They occur chiefly in alpine regions and in the polar seas, and are only seen when sunshine and cloud, or fog, occur at the same time. They appear in the following way: when, from an elevated position—as the mast of a ship, or the ridge of a hill—the shadow of an observer is projected by the sun on a cloud or fog, he sees the head encircled by a glory or luminous ring, diminishing in brightness as it leaves the head as a centre. When the sun shines brightly, and the fog is dense, as many as four concentric rings of this nature are seen by the observer round the shadow of his head, having their common centre in the point where a line from the sun through the eye of the observer meets the fog. When the phenomenon assumes this form, the rings are more or less colored—the colors of the two inner rings being generally brilliant, those of the third more faint, while those of the fourth are scarcely perceptible. This last has an angular radius of about 40°, and is very seldom seen. It bears frequently the name of the Circle of Ulloa or the White Rainbow. A phenomenon substantially similar to the A. occurs when, the sun being near the horizon, the observer sees an aureola surrounding the shadow of his head cast upon grass or grain moistened with dew. The occurrence of A. is generally attributed to the diffraction (q.v.) of light.

ANTHELMINTIC, a. *ān'thēl-mŭn'tik* [Gr. *anti*, against; *helmins* or *helmin'tha*, a tape-worm]: destructive to intestinal worms: N. the medicine for intestinal worms: such are oil of fern, oil of turpentine, pink-root, pomegranate seeds, pumpkin-seeds, santonin, senna.

ANTHEM, n. *ān'thēm* [Gr. *anti*, opposite; *hymnos*, a hymn: F. *antienne*]: a sacred song, or a portion of Scripture set to music; short sentences of texts used in a Liturgy. *Anthem* is by some authorities considered to be simply *anti-hymn*, in the sense of a composition different in words and music from the ordinary church hymn. *Anthem* is by others said to be from Gr. *anti*, opposite; *phone* voice; a piece sung in alternate parts; thus a mere corruption of mid. L. or Gr. *anti-phōnā*, meaning an answering sound: to this it may be objected that we have its derivative *antiphon* in common use in its own proper sense from the earliest times, especially in the R. Cath. Church, in whose service the word *anthem* is unknown. F. *antienne* is plainly connected with Eng. *anthem*, but can only by force be regarded as a derivative from *antiphōnā*; F. *antiphone* = Eng. antiphony. We have such OE. forms as *anthymn* and *anthym*. The A. was introduced into the service of the English Church after the Reformation, and appointed to be sung daily, at morning and evening service, after the third collect. The



## ANTHEMIS--ANTHOLITES.

words of the A. are taken from the Psalms, or other suitable parts of the Scriptures, and the music is either for solo, soli, or chorus, or a mixture of all three. As a specimen of English music, it can be heard to perfection only in cathedral service. In its origin, musical construction, and use, it is similar to the motet of the R. Cath. Church, which name has been retained by the Lutheran Church. See ANTIPHONY; MOTET.

ANTHEMIS: see CHAMOMILE.

ANTHER, n. *ăn'thēr* [Gr. *anthēros*, flowery, blooming]: in *bot.*, the head part of the stamen of a flower, containing the pollen or fertilizing dust. AN'THERAL, a. *-āl*, pertaining to. ANTHERIFEROUS, a. *ăn'thēr-ĭ'ēr-ūs* [L. *fero*, I bear]: bearing anthers or flowers. AN'THERID'IUM, n. *-ĭd'ĭ-ŭm* [Gr. *eidos*, resemblance]: the supposed male organ in cryptogams. See STAMEN.

ANTHERIDIUM, *ăn'thēr-ĭd'ĭ-ŭm*: name given by late botanists to an organ in the mosses and ferns which they suppose to be analogous in its functions to the stamen or male organ of fructification in phanerogamous plants. Antheridia are variously situated on the surface of plants or within their tissue. Sometimes they are simple cells; sometimes they are composed of a number of cells, containing a mucilaginous fluid, and peculiar small bodies called *Phytozoa* (q.v.), which at a certain period exhibit active movements like those of animalcules. The antheridia finally discharge their contents through an opening; and it is reasonably supposed their contact with another class of organs, to which the name PISTILLIDIUM (q.v.) has been given, is essential to the production of a sexually generated kind of spores, needed to recruit the species, though ferns, as well as many lower flowerless plants, also produce asexual spores. See also ARCHEGONIUM.

ANTHEROZOIDS, n. plu. *ăn'thēr-ō-zō'ĭdz* [Gr. *anthēros*, flowery, blooming; *zoē*, life; *eidos*, resemblance]: the movable, impregnating, or male corpuseles of the algæ, mosses, and ferns;

ANTHESIS, n. *ăn-thē'sĭs* [Gr. *anthēsis*, bloom—from *anthos*, a flower]: in *bot.*, the opening or bursting of the flower; the period of blooming.

ANTHOCARPOUS, a. *ăn'thō kâr'pŭs* [Gr. *anthos*, a flower; *karpos*, fruit]: formed, as a certain class of fruits, from the united ovaries of a number of flowers.

ANTHOCYANE, n. *ăn'thō sĭ'ăn-ĕ* [Gr. *anthos*, a flower; *ku'ānos*, dark-blue, sky-colored]: the supposed blue coloring matter in flowers of that hue.

ANTHODIUM, n. *ăn-thō'dĭ-ŭm* [Gr. *anthōdēs*, flowery—from *anthos*, a flower; *eidos*, resemblance]: the capitulum or head of flowers of composite plants.

ANTHOLITES, n. plu. *ăn'thō lĭts*, or ANTHOLITHES, n. plu. *ăn'thō-lĭthz* [Gr. *anthos*, a flower; *lithos*, a stone]: a general term for the fossil impressions of flowers, such as occur in the shales of the coal-measures; a fossil plant of the coal measures, apparently a spike of flowers.

ANTHOLOGY, n. *ăn-thŏl'ŏ-jĭ* [Gr. *anthos*, a flower; *logos*, discourse]: a discourse on flowers; a collection or selection of flowers of literature, as of poetry or epigrams. AN'THOLOG'ICAL, a. pert. to. Anthology is the title usually given to a book consisting of an unconnected series of choice thoughts, in prose or verse, generally the latter. Of the collections of this kind made in ancient times, which consisted mostly of epigrammatic poems, the best known are the

*Greek Anthologies*.—The first Greek A. was compiled by Meleager of Gadara, Syria, about B.C. 60. Three or four others belonging to periods considerably subsequent to the birth of Christ are lost. Now extant are two later collections, one by Constantine Cephalas, 10th c., who borrowed largely from one of the earlier anthologies; and another by Maximus Planudes, a monk of Constantinople, 14th c., who, by his tasteless selection from the A. of Cephalas, rather spoiled than increased the already existing store. The A. of Planudes was first issued in print, Florence, 1494, by a learned Greek, John Lascaris, and for a long time was the only one known. It went through successive editions, and received various improvements. The latest edition (with the Latin version of Grotius, a master-piece of latinity and rapid execution) was commenced by Bosch, 1795, and finished by Lennep, 1822. Meanwhile, Claude Salmasius had discovered in the Heidelberg Library (1606) the only extant manuscript of the older and richer A. of Constantine Cephalas, which he compared with that of Planudes, copying out the poems not found in the latter. During the Thirty Years' War, the Heidelberg manuscript was carried to Rome; but in 1797, after the peace of Tolentino, the French secured possession of it, and brought it to Paris. In 1816, it was returned to Heidelberg. After the important discovery of Salmasius, the work was often mentioned by the name of the Palatinate Manuscript, or the Vaticano-Palatinate. Portions of it were published by Jensius, Leich, Reiske, and Klotz. The entire collection, augmented by fragments of the older poets, and by epigrams found on monuments and in other works, was edited by Brunck, Strasburg, 1776, under the title *Analecta Veterum Poëtarum Græcorum* (Selections from the Old Greek Poets), and later by Jacobs, under the title of *Anthologia Græca, sive Poëtarum Græcorum Lusus ex Recensione Brunckii* (Greek A., or Fugitive Pieces of the Greek Poets, from the Corrected Text of Brunck), 1794–1814, Leipsic. Since then, it has been published variously, in whole or part. It is impossible not to admire these gems. There is a rich variety of poetic life, great delicacy of sentiment, a joyous serenity, and an abundance of wise, true, and humane thoughts. To the poet, it presents graceful images and exquisite conceptions; to the philosopher, maxims of wisdom; to the historian, monumental inscriptions; to the philologist, the most varied forms of an imperishable language.

*Latin Anthologies*.—In 1573. Scaliger published at Leyden, in imitation of the Greek A., a Latin A., under the title *Catalecta Veterum Poëtarum* (Gatherings from the Old Poets), and Pitthöus one at Paris. 1590. A larger collection



was issued at Amsterdam (1759 and 1773) by Peter Burmann the Younger, under the title *Anthologia Veterum Latinorum Epigrammatum et Poëmatum* (A. of Old Latin Epigrams and Poems), a more correct and better-arranged edition of which was published by Meyer, 1835.

*Asiatic* literature is extremely rich in anthologies, which consist sometimes of extracts from the best poets, arranged according to the subject, and sometimes of 'beauties' of their best poets, with biographical notices, in an order either chronological, or according to the countries in which the authors lived.

1. *Arabic Anthologies*.—Abu-Teman published selections from the old Arabic songs before the time of Mohammed, arranged them in ten books, and named the entire collection after the first book, which consisted of war-songs, *Hamása*. Another famous A. is the *Divan* of the Hudhailites (an Arabic tribe), an edition of which was published by Kosegarten. Abu'l-Faraj of Ispahan (d. 966) gathered together in his *Kitáb al-aghâni* (Book of Songs), all the ancient Arabic songs down to the first centuries of the Caliphate. It was published by Kosegarten in 1840. Abu'l-Faraj accompanied the work with a minute commentary, which makes it one of the most interesting of the old Arabic literature. But the richest and most complete A. of the later Arabic poesy is *Yatimat al-dahr* (the Pearl of the World), by Taalebi, in which the writers are arranged according to the provinces in which they lived. It has been continued and enlarged since the period of the original compiler. Besides these and similar national anthologies, collections have been made in almost every province where the Arabic culture and speech prevailed. Such, for example, are the numerous Arabico-Spanish ones, though these are little known.

2. *Persian Anthologies*.—In the Persian literature, the best known works of this sort are *Taskarat al Shuara* (Lives of the Poets), by Daulet Shah (d. 1495), the contents of which are to be found almost entire in Hammer's work on Persian *belles-lettres* (Vienna, 1818), and *Atesh Kedah* (the Fire Temple), by Haje-Lutf-Ali-Beg, who lived about 1770. Both works give biographical notices of the Persian poets: the first, in chronological order; the second, in topographical order, with specimens from their works. An A. of the best Persian poetry, arranged according to the subjects, is given in the *Medshua al Shuara* (a Collection of Poets).

3. *Tatar Anthologies*.—Of the poets who have written in the Tatar—i.e., the East Turkish or Tshagatai dialect—we possess a collection comprising 441 biographies, with specimens of their poetry: *Madshalis alnasais* (Charming Company), by Mir-Alischir (d. 1500), and the *Lives of the Tatar Poets*, by Sadiki, extending down to the 17th c.

4. *Turkish Anthologies*.—The number of anthologies in the West Turkish, generally called the Turkish language, is very numerous. The most famous are—*Hesht Behesht* (the Eight Paradises), by Sehi of Adrianople (d. 1548); *Taskarat al Shuara* (Lives of the Poets), by Latifi (d. 1582), and, under the same title, a similar work of Ashik Tshelebi

(d. 1571); and the great collection, *Subdat al-ashaa'* (the Blossoms of Poetry), by Kassade (d. 1621). The substance of these anthologies is to be found in Hammer's *History of West Turkish Poetry* (Pesth, 1836).

5. *Indian Anthologies*.—The literature of the Mohammedan population of Hindustan, which is a mere copy of Persian literature, has also several anthologies. The most important are—*Gulzari Ibrahim*, by Ali Ibrahim, containing biographical notices of 300 Hindustani poets, with specimens of their writings; the collection called *Diwani Iihan*, by Beni-Narâyan; *Guldastai Nishât* (Garland of Pleasure), by Manu Lal (Calcutta, 1836); and *Guldastai Nâznînân*, by Kerim-ed-din (Calcutta, 1845). The substance of these works is to be found in Garcin de Tassy's *Histoire de la Littérature Hindui et Hindustani* (Paris, 1839-47), which, under the title of *Tabakâti Shuarâi Hindi*, was translated into Hindustani by Kerim-ed-din (Delhi, 1848). In the pure Hindi, we have a rich collection of songs, the *Râgd Sâgar*, by Krishnânanda (Calcutta, 1845).

6. *Sanscrit Anthologies*.—The Sanscrit literature is not so rich in anthologies as the other oriental literatures. If we do not consider the Vedic hymns, and the collections of poems which bear the general title *Sataka* (A Century), anthological in the proper sense, there is only one work of this kind known—viz., the *Paddhati*, by Sarngadhara, towards the close of the 14th c., in which are gathered together 6,000 detached strophes of the most famous epic, lyric, and dramatic poets of India, arranged under certain heads.

7. *Chinese Anthologies*.—From the earliest ages, the Chinese had the custom of sending, with the yearly tribute to the emperor, copies of such songs as had acquired popularity. Confucius selected from a great number of these 311 of the most beautiful. These are preserved under the name *Shi-king* (Book of Songs), one of the canonical books of the Chinese. This is the oldest A. in the world. A Latin version, by Lacharme, was pub. Stuttgart, 1830; a German one, by Rückert, Altona, 1833. Besides this, there is *Tchao-ming-wen-siouen*, a collection of the finest poems of the time of the Liang dynasty (A.D. 502-556), and also *Thang-shi*, poems of the time of the Thang dynasty (618-914).

ANTHON, *ân'thon*, CHARLES, LL.D: 1797-1867, Jul. 29; b. New York: well-known editor of classics. He graduated from Columbia Coll. at the age of 18, studied law in his brother's office, and was admitted to the bar of the Supreme Court of N. Y., 1819. His time, however, was given chiefly to classical literature; and in 1820 he was appointed adjunct Prof. of Languages in Columbia Coll., which office he held for 15 years. His series of classical publications did much to make available for popular purposes the erudite researches of European scholars. His first work was a new edition of Lempriere's *Classical Dictionary*, almost immediately re-issued in England. In 1830, appeared his larger edition of Horace, quite a novelty, on account of the superabundant English notes which accompanied the text. In 1833, he issued a smaller edition, for the use of schools and



colleges. Virgil, Cæsar, and other ancient writers have been illustrated in the same attractive manner. A.'s editions of the classics have been very popular, but scholars regard them with a kind of learned aversion, both because of the temptations which they present to the learner to overlook the difficulties of a knotty passage, and of the superfluous and often unimportant matter dignified with the title of 'commentary' or 'notes.' However, these works have given a healthy stimulus to the rudimentary study of the ancient authors. In 1831, A. received the degree of LL.D. from his Alma Mater. In 1835, he succeeded Prof. Moore in the chair of languages. A. likewise published large works on ancient geography, Greek and Roman antiquities, mythology, literature, etc.

ANTHON, JOHN, LL.D.: lawyer: 1784, May 14—1863, Mar. 5; b. Detroit; brother of CHARLES A. He graduated at Columbia College 1801, was admitted to the bar 1805, became a founder and pres. of the New York Law Institute, and published *Anthon's Law Student* and *American Precedents* (1810), and other works.

ANTHONY, *ăn'tho-nĩ*, HENRY BOWEN: 1815, Apr. 1—1884, Sep. 2; b. Coventry, R. I.: statesman. He graduated at Brown Univ. 1833, edited the *Providence Journal* 1838–59, was gov. of R. I., 1849–51, and U. S. senator from 1859 till his death, serving on the committees on claims, naval affairs, mines and mining, and post-offices and post-roads.

ANTHONY, JOHN GOULD: 1804, May 17—1877, Oct. 16; b. Providence, R. I.: naturalist. He received a limited education, was engaged in commercial business Cincinnati 35 years, applied himself closely to the study of natural history from boyhood, accompanied Prof. Agassiz on the Thayer expedition to Brazil, 1865, and was in charge of the conchological dept. of the museum of comparative zoology from 1863 till his death.

ANTHONY, SAINT: see ANTONY, SAINT.

ANTHONY, SUSAN BROWNELL: reformer: b. South Adams, Mass., 1820, Feb. 15. She was educated in a Friends' school, taught school in N. Y. 1835–50, began speaking in public 1847, aided in organizing the woman's N. Y. State Temperance Soc. 1852, became a leader in the anti-slavery movement 1857, and began advocating the co-education of the sexes 1858. Since 1854 she has directed her energies to promoting the cause of woman's suffrage, and 1868 began publishing *The Revolutionist* in aid of the movement. In 1870–80, she lectured in all the n. and several of the s. states, and 1881 in conjunction with Elizabeth Cady Stanton and Matilda Joslyn Gage published *The History of Woman Suffrage* in two volumes.

ANTHONY, WILLIAM ARNOLD: physicist: b. Coventry, R. I., 1835, Nov. 17. He graduated at the Sheffield Scientific School (Yale) 1860; taught the sciences at E. Greenwich, R. I., 1860–61, Franklin, N. Y., 1863–67, Antioch College 1867–70, and the Io. Agricultural College 1870–72; and was prof. of physics in Cornell Univ,

## ANTHONY'S FIRE—ANTHRACITE.

1872-87. He has designed and constructed a number of important electrical apparatus, and contributed numerous papers to the American Assoc. for the Adv. of Science and the American Institute of Electrical Engineers, of both of which he is a member, and to several electrical and scientific publications.

ANTHONY'S FIRE, *ăn'to-nĩz*, St.: erysipelas (q.v.): see ANTONY, SAINT.

ANTHONY'S NOSE: (1) in Montgomery co., N. Y., on the n. branch of the Mohawk river, on the extremity of the hill or mountain called the Klips (rock or cliff); slopes from an elevation of about 500 ft. toward the river, and when viewed from the river at the n. entrance to the Highlands resembles a nose 300-400 ft. long; (2) bold promontory on the e. side of the Hudson river in Putnam co., N. Y., projecting from the s. side of Breakneck Hill, opposite the site of old Fort Montgomery, near the s. entrance to the Highlands, below West Point.

ANTHOPHORE, *n. ăn'thō-fōr* [Gr. *anthos*, a flower; *phō'rēō*, I carry]: in *bot.*, a stalk supporting the inner floral envelopes, and separating them from the calyx.

ANTHOPHYLITE, *n. ăn'thō-fĩl'it* [Gr. *anthos*, a flower; *phullon*, a leaf]: a variety of hornblende of a gray or clove-brown color, so named from the resemblance of its color to that of the *anthophyllum* or clove; it is sometimes green.

ANTHOTAXIS, *n. ăn'thō-tăks'is* [Gr. *anthos*, a flower; *taxis*, arrangement]: in *bot.*, inflorescence.

ANTHOXANTHUM: see VERNAL GRASS

ANTHRACENE, *n. ăn'thra-sēn*, or AN'THRACIN, *n. -sĩn* [Gr. *anthrax*, or *anthrăka*, burning coal]: a solid, crystalline hydrocarbon ( $C_{14}H_{10}$ ) obtained from coal-tar. See ALIZARINE.

ANTHRACITE, *n. ăn'thră-sĩt* [Gr. *anthrax* or *anthrăka*, burning coal]: a hard shining coal that burns without smoke or flame. ANTHRACONITE, *n. ăn'thrăk'ō-nĩt*, a term applied to those varieties of marble which have a coal-black lustre when polished. AN'THRACIT'IC, *a. -sĩt'ĩk*, pertaining to.

ANTHRACITE: hard coal; a mineral substance of the nature of coal; consisting of carbon with a minimum amount of hydrogen. It is of a black color, conchoidal fracture, and imperfectly metallic lustre (hence called *glance-coal*). It burns slowly, and mostly without flame, and hence is sometimes called *blind-coal*. Its vegetable origin cannot be doubted. Where strata of common coal have been broken through by trap-dikes, the coal next the trap is found to be A., with a gradual transition into the softer state; hence geologists regard A. as debilitized coal; it occurs where rocks have been altered by heat from disturbance. Extensive mines of A. are in e. Penn., whence is derived most of the fuel used in the states of the Atlantic seaboard for manufacturing and domestic purposes. See COAL; CARBONIFEROUS SYSTEM.



## ANTHRACOSAURUS—ANTHROPOLATRY.

**ANTHRACOSAURUS**, n. *ăn'thră-kō-saw'rūs* [Gr. *anthrax*, coal; *sauros*, a lizard]: a large fossil saurian occurring in the coal-measures of Britain.

**ANTHRACOTHERIUM**, n. *ăn'thră-kō-thē'rī-ŭm* [Gr. *anthrax*, coal; *thērion*, a wild beast]: a fossil thick-skinned animal of the hippopotamus kind, found among the lignites.

**ANTHRAKERPETON**, n. *ăn'thră-kēr'pě-tŏn* [Gr. *anthrax*, coal; *herpēton*, a reptile]: a genus of fossil reptiles of a primitive air-breathing type.

**ANTHRAX**, n. *ăn'thrăks* [Gr. *anthrax* or *anthrăka*, burning coal]: a carbuncle; a local suppuration which may be idiopathic, or may accompany other diseases as diabetes, or malignant fevers such as the plague, etc.—common also in lower animals. See **SPLENIC FEVER: CATTLE-PLAGUE**.

**ANTHRACOID**, a. *ăn'thră-koyd* [Gr. *eidōs*, resemblance]: pertaining to or resembling an anthrax or carbuncle.

**ANTHROPOGRAPHY**, n. *ăn'thrō-pŏg'ră-fī* [Gr. *anthrōpos*, a man; *graphē*, a writing]: that branch of physical geography which treats of the distribution of the races of mankind. **ANTHROPOID**, a. *ăn'thrō-poid* [Gr. *eidōs*, resemblance]: applied to those species of the monkey which most nearly approach the human form. **ANTHROPOLITE**, n. *ăn'thrōp'ŏ-līt* [Gr. *lithos*, a stone]: a petrification of the human body, or a part of it. **ANTHROPOLOGY**, n. *ăn'thrō-pŏl'ŏ-jī* [Gr. *logos*, discourse]: the natural history of the human species; the science that has man for its subject. It includes Anatomy, Physiology, Psychology, Ethnology, History, Sociology, Theology, Æsthetics, etc.: see these titles: also **ANTHROPOLOGY**, and the references. **ANTHROPOLOG'ICAL**, a. *-pŏ-lŏj'ī-kāl*, pertaining to. **AN'THROPOL'OGIST**, n. *-o-jist*, one skilled in the knowledge of the natural history of mankind.

**ANTHROPOLATRY**, n. *ăn'thrō-pŏl'ă-trī* [Gr. *anthrōpos*, a man; *latreia*, worship]: the worship given to a human being; a term employed in reproach. Thus, the early Christians accused the heathens of A., because, in their mythology, men were represented as exalted among the gods, although an *apotheosis* (q.v.) was in these cases alleged by their worshippers; and the heathens retorted the charge because of the worship of Christ; the reply to which was the assertion of his oneness with God. But the term is chiefly known in ecclesiastical history in connection with the employment of it by the Apollinarians (q.v.) against the orthodox Christians of the 4th and 5th c. with reference to the doctrine of the perfect human nature of Christ.

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ANTHROPOLOGY, *ăn'thrō pōl' ō-jē* [Gr. *anthropos*, man; *logos*, discourse]: science of man; his natural history, including his entire nature and development. A. is not an exclusive science, but includes all the sciences in their reference to Man: for instances, see MAN: ETHNOLOGY: COSMOGONY: GOVERNMENT: PHILOLOGY: ANATOMY: PHYSIOLOGY: PSYCHOLOGY: INSTINCT: EMOTION: SENSATION: INTELLECT: WILL: SOUL: RELIGION: ETHICS: ETC.

In the division of A. relating to Man's origin and his place in nature, the Evolution theory is now prevalent among scientific men: see DESCENT OF MAN: DEVELOPMENT OF THE EMBRYO: DARWINIAN THEORY: SPECIES: ETC. A modification of this view by Alfred Russel Wallace, *Darwinism, an Exposition of the Theory of Natural Selection* (1889), is here noted—with additional remarks in general.—Treating of the principle of continuity, relied upon for the derivation of man's entire nature from the brute, he says: 'Because man's physical structure has been developed from an animal form by natural selection, it does not necessarily follow that his mental nature, even though developed *pari passu* with it, has been developed by the same causes only.' According to the early teaching of Lyell, certain causes were held to be amply sufficient to account for geological phenomena. But, in the demonstration of a glacial epoch, a new and altogether distinct cause of many phenomena, producing new effects late in the earth's history, yet continuous with preceding effects, is apparent. Applying this illustration to man's intellectual and moral nature, Wallace goes on to show that certain definite portions of this could not have been developed by variation and natural selection alone, and that, therefore, some other influence, law, or agency is required; and we may justly assume that the same unknown cause has profoundly affected man's whole development. The mathematical faculty, rudimentary in savages, and amazingly developed only in the last three centuries among civilized nations, shows that the Darwinian theory of useful variations, in the struggle of existence, cannot account for the origin and increase of all the faculties of mind, as it does for those of the body. So with music: the Romans and Greeks knew nothing of harmony and the essential features of modern music; only since the 15th century has it been marvellously developed; and it seems to be latent, having had nothing to do with the battle of life, in the lower races, who now, under training, can perform creditably the best modern music. The pictorial and plastic arts have appeared here and there, in their glory, and have not helped the struggle of man with man and his environment. Moreover, while among animals the range of variation is about from 80 to 120, taking the mean to be 100, the difference of capacity among men, in mathematics and art, is enormous; and the capacity often appears suddenly in a family. Similar facts pertain to the faculties of metaphysical speculation and of wit and humor. The inference is that we



must recognize in these special faculties, thus manifested, an origin wholly distinct from that of animal characteristics—something which we may best refer to a spiritual essence or nature. And thus we may further understand much that is otherwise unintelligible—the constancy of the martyr, the unselfishness of the philanthropist, the devotion of the patriot, as well as the love of truth, the delight in beauty, the passion for justice, the admiration for courageous self-sacrifice—all that pertains to a higher principle than that of animality. If it be objected that the admitted continuity of man's progress from the brute does not admit of new causes or exhibit any sudden change, it may be answered that at three points some new cause or power must necessarily have come into action: first, at the change from inorganic to organic; second, at the introduction of sensation or consciousness; third, at the beginning of the existence in man of his most characteristic and noble faculties—none of these explainable by any increasing complexity of structure. These three distinct stages of progress point clearly to an unseen universe, with its inflowing forces, and to the world as a consistent whole, adapted to the development of spiritual beings. It may be added that Wallace (who shares with Darwin the credit of the theory of the derivation of species by natural selection) has in previous writings contended that the brain and hand of ape and savage are already developed far beyond any needs of a wild life, as shown by the adaptability of these organs to the highest uses of mind and civilization; thus there was a Divine prophecy and preparation looking to man in his utmost exaltation.

In regard to the alleged germs of moral and religious sense in animals below man, nothing has been adduced that is philosophical and decisive. In respect to a *reasoning power*, it should be remarked that a mental process resembling this is common to both men and animals—namely, thinking by images, and the suggestion of one thing by another that is similar, without any necessary noting, abstraction, and comparison of attributes, and followed by associated impulses. Sensation, and the association of sensations present or remembered, were regarded by the general school of cerebralists as sufficient to explain all intellectual processes, until the new comparative psychology sought to find something higher in animals. Reasoning, in its high and proper sense, as the noting of a similar quality by comparison, abstracting it, generalizing it, and affirming it as standing in a fixed or universal relation to another quality—in short, as dealing with concepts, or abstract general conceptions—is distinctive of man. G. J. Romanes, the literary executor of Darwin, is the latest and ablest advocate of reason in animals, but he admits (*Contemporary Review*, vol. iv.) that the higher cognitive powers all are resolvable into abstraction; Huxley resolves ratiocination into predication; and both John Stuart Mill and his father show that this implies not only the recognition

of relations, but of these as true. All this is implied in noting similarities—that is, in notion, in concept, in thought taken in its distinctive sense. An animal, then, must have all the elements of reasoning proper or none. It is the applying of abstractions to successive objects of sense or of thought, and the linking of abstractions as fixed or inherent. Quality cannot be regarded as such except in and for all the processes and uses of reason. As to the apparent analogy between acts of animals and the reasonable procedure of men, instinct and impulsive association are unquestionably the ruling fact in animals, and we are to incline to these explanations where there is room for doubt. The strongly marked cases of quasi-reasoning are certainly exceptional, unlike the reasoning of man, and they may be presumably accidental, as indeed are some of the seemingly wisest achievements of man. Animals have a superhuman quickness and permanence of sense associations, and the only wonder is, therefore, that wonderful instances of their so-called sagacity are not more common; and this endowment it is that makes reasonable the Darwinian theory of the building up of instincts by the preservation of useful variations of act. At the same time, with marvellous perfection of senses, brutes blunder in perception to a degree in which they should not, if reason accompanied this remarkable perfection; they are easily deceived. It is admitted that acts analogous to those of human intelligence are observable in the three lower subkingdoms of animals; yet no one would claim that reason is present there. Besides, the quasi-reasoning is confined to the narrow lines of subsistence, attack and defense, or mere play-impulse, in all which we should expect that the explanation now given would be sufficient. Reason, as we know it in man, is at first zero, and long and slow in development; whatever the mental outfit of the lower orders may be, it does not include such an element. The quasi-reasoning hardly advances in the individual for life and in the species for ages—the instances of progress gathered being poor and rare. The theory of rationality in brutes involves so high processes of thought as to be incredible, and there is no evidence of any language of abstractions, of concepts, which are the staple of human speech; moreover, the character of all of man's mental powers is so changed by self-consciousness that the analogy fails. In regard to comparative anatomy, the latest doctrine is that the size and complexity of the brain are related to all the activities of its possessor; this accounts for much similarity of brain between men and animals, with dissimilarity of mind. At the same time, there is no high manifestation of intelligence without high brain; and, below man, the brain rapidly diminishes, until it in effect disappears below vertebrates. Gegenbaur repeatedly says and illustrates that the modifications of the supraesophageal ganglia of invertebrates are in connection with and dependent on the sense-organs. (See Henry W.



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Parker's *Spirit of Beauty*, chap. ii. 'Mind in Animals.' For an example of the sudden and lasting linking of sensation and impulse, see *Revue Scientifique*, 1889, May 4, art. *Formation d'un instinct parmi des animaux vivant en société.*)

The antiquity of man has been much revised of late, by scientific men. The relics found in the valley of the Somme, France, by M. Boucher de Perthes, are always quoted; but the examination of the locality by Dr. E. Andrews (see *Amer. Jour. Sci.*, vol. xlv., 2d series) seems to be overlooked. In the 20 ft. of gravel that yielded flint implements, he found evidence of very rapid deposition; the overlying layers of clay had broken down into large cavities that must have been formed by drifting blocks of ice, ultimately melted; besides, there were angular masses of soft chalk and boulders of sandstone of a ton's weight, both evidently brought by ice; and the whole was not true glacial drift, but indicated river floods—quite inconsistent with De Perthes's slow annual deposit and Sir J. Lubbock's opinion that it was the extremely slow work of untold ages. Above the gravel are 26 ft. of peat, estimated by De Perthes as formed at the rate of an inch or two a century, the total amounting to 15,000 to 20,000 years; but it proved to be forest peat, containing upright, very perishable trunks of birch, rooted in place. On the suppositions of De Perthes, some of these trunks, over 3 ft. high, must have stood undecayed 2,000 to 2,600 years before they were covered, which is incredible. Roman remains at the depth of 6 ft. (after adding 6 or 7 centuries since the deposit ceased) indicated about 5,800 years since the beginning of the bed of peat. Dr. Andrews also visited the gravel half-cones formed against a precipice by the Tinière torrent, near Villeneuve, at the eastern end of Lake Geneva. A railway cut across the lower cone, exhibiting 4 ft. with Roman relics, underlain by 10 ft. of the bronze age and 19 of the stone age, seemed to give positive data for Morlot's estimate of 96,000 to 143,000 years for both cones. But he had simply divided the radius of the cones by the present annual depth of deposit, instead of estimating the cubic ft. of this, spread over a large surface, and using it as divisor for the cubic contents of the whole—the quotient being nearly 5,000 years for the lower cone. Moreover, the upper cone and the gorge above it revealed abundant signs of great flood action, like those of the gravel in the valley of the Somme. From the beaches of Lake Michigan, Dr. Andrews derives 5,300 to 7,500 years since the erosions and deposits there began (*Amer. Jour. Sci.*, vol. i., 2d series); and his conclusions are accepted by the expert Prof. George F. Wright, 1889. The most remarkable reversal of former judgments is in the case of Niagara Falls as a chronometer of geological time—important because the formation of the gorge, especially its lower portion, began at the end of the ice age, which epoch, thus far, gives the only trustworthy evidence of the appearance of man. Lyell estimated the recession of the

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Falls from Queenstown as occupying 35,000 years. Desor made it a hundred times more—3,500,000 years. But an accurate trigonometrical survey, with map, was made 1842, by direction of Prof. Hall; and from this and the present line of the cataract, G. K. Gilbert of the U. S. Geol. Survey computes the maximum length of time since the birth of the Falls to be 7,000 years, 'and even this small measure may need significant reduction.' Similar results have been reached by Prof. W. H. Winchell in regard to the recession of the Falls of St. Anthony, since the river occupied an old pre-glacial bed, from above the Falls to near Fort Snelling (see *Geol. Survey of Minn.*, 1882-85); also by Prof. Wright, from examination of the gorges of tributaries to Lake Erie, and from a discussion of valley excavations, the small filling of lakes and 'kettle-holes' dating from the ice age, the comparative freshness and unchanged species of organic remains in glacial deposits, and the desiccation of lakes in the Rocky Mountain plateau (see *The Ice Age in North America, and its Bearings on the Antiquity of Man*, by Prof. George F. Wright of the U. S. Geol. Survey, 1889). The famous 'Calaveras skull' and other findings in old river-beds, under the lava deposits of California, are still quoted often—referred by Prof. J. D. Whitney to the Pleiocene or even the Miocene age. Prof. W. Boyd Dawkins says that the auriferous gravels offer no trustworthy evidence upon the question, and that the human remains belong to the ancestors of the present native tribes; and Prof. Le Conte (*Elements of Geology*) remarks that there is doubt as to the age and authenticity of the finds and the undisturbed condition of the gravels, and that the remains are not paleolithic, but neolithic. Even the findings in the valley of the Somme are assailed by some geologists (see remarks by T. K. Callard, F.G.S., in *Trans. Victoria Institute*, vol. xvii.). Dr. Carpenter found that the human jaw discovered there was an imposition. The pottery found by Leonard Horner in the alluvium of the Nile, 30 ft. 4 in. below the surface, and on which he based an estimate of 13,700 years, is of no further account, since Roman pottery has been found there at lower depths. Brydone, from seven alternating strata of lava and soil on Mt. Etna, deduced 14,000 years; however, six similar strata were found over Herculaneum. Much has been made of astronomical calculations; on these Croll put the beginning of the glacial period 240,000 years ago, and its end 70,000; but if the amount of the sun's heat, rather than the condition of the atmosphere, determined the temperature, the difference between the mean annual temperature at the equator and that of the 67th parallel should be 172 degrees instead of 75, as it really is. Astronomers (see Newcomb's *Popular Astronomy*) now tend to diminish geological time.

The *unity of the human race* is not now questioned, since it is found that the races differ less from each other than groups of animals, to whom a common origin is attributed, differ among themselves; and the tests accept-



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ed for animals hold good among men even of the remotest affinities. The permanence of human types since the remotest historical times, in connection with the geologically recent appearance of man, is a great difficulty, but only on the supposition that variations must have always been slowly accumulative. In the strongly marked Hebrew race, there is a type that may have been originated and fixed in one family, that of Abraham, within the historic period; and, more remotely, other families, with more marked, even very abnormal, differences, may have been as sequestered by circumstances as the Hebrew by religion, and have given rise to tribes and nations. The greatest difficulty is the fundamental unlikeness in the grammatical structure of certain languages. It does not seem to have been considered that fragments of the human race may, in more ways than one, have lost language, or lost an early rude stage of its structure, and built up new syntax and inflections, and even a monosyllabic form like the Chinese—a supposition the more admissible since more than one instance is known of isolated children originating a language of their own. As to differences of mere vocabularies, these are illustrated among even neighboring tribes of N. Amer. Indians, who are none the less of the same stock.

For the *classifications of the human race*, see ETHNOLOGY.

The *history of the progress of man* begins with a stone age, which, however, has been continued to our times in some of the ruder tribes. There was first the paleolithic period, when implements were rudely fashioned from stone, followed by the neolithic, with its more varied, better shaped, and polished forms, and with some rare evidences of pictorial embellishment. Next came the bronze age, exhibiting higher art. Of the lowest savages now living, the Australians and some of the S. Amer. Indians are examples. Yet they are a long way from absolute savagery, having skilfully wrought weapons, defenses, and tools of a various industry; they manufacture boats, nets, mats, and baskets, and ornament their work; they cook their food; they recognize family duty, and they have their religious beliefs. This condition, in its material aspects, certainly does not represent the most primitive, which has its ideal in the first parents of the Adamic race, who were beginning to name things, were ignorant of good and evil, lived on fruits, and had to invent clothing. Above the present lowest stage comes the pasturing of flocks, the introduction of agriculture, the manufacture of pottery, and attempts at picture-writing, exhibited more or less by N. Amer. Indians, some of whom, as tribes on the n.w. coast, are skilful in sculpture; and others, like the Zunis, build permanent habitations. It is fair to infer that these existing gradations represent the prehistoric progress of which, in the nature of the case, no record survives other than a few relics. All the present civilizations may be traced back to rude beginnings. The

## ANTHROPOMETRY.

great steps of progress were the passage from a wandering life to a fixed and agricultural system, the working of metals, and the invention of something equivalent to writing; also the concentration of energy by a government less simple than the patriarchal. The early development of special arts, also of religious beliefs and ceremonies, offers a wide field for the imagination of the theorist: and it is reasonable to infer that the grand piano originated in the twang of a bow-string; but the infinite expressiveness of music and of man's susceptibility to it cannot, therefore, be resolved into a twang of dried sinew. Dreams of the dead might be conceived of as having first awakened a spiritual faculty, and offerings or other ceremonies in honor of the dead as having been prompted by reverence; but religion is not, therefore, made up of dreams and ceremonies. Coming down to later historic times, anthropology includes the interesting history of the development of all that concerns man. Of this there is no room for an outline in any sketch of anthropology. The earth, as adapted to the several stages of man's progress (see Guyot's *Earth and Man*) and as provided with materials for it—illustrated in geology and natural theology—also as modified by man and modifying his history (see *The Earth as Modified by Human Action*, George P. Marsh, and Buckle's *Hist. of Civilization*), should fill an important place in the science of man. Consult, further, Whately's *Essay on the Origin of Civilization*, Tylor's *Researches into the Hist. of Mankind*, *Primitive Culture*, *Anthropology, an Introduction to the Study of Man and Civilization*, and Sir J. W. Dawson's *Story of the Earth and Man*.

ANTHROPOMETRY, n. *ăn'thrō-pōm'ě-trĭ* [Gr. *anthrōpos*, a man; *metron*, a measure]: the systematic examination of the heights, weights, etc., of human beings; the art of measuring the remains of past races of men with the view of comparing different races. The art has lately been applied with remarkable results to the identification of criminals, previously very minutely measured in detail, as well as in stature, for this purpose. AN'THROPOMET'RIC, a. *-mět'rĭk*, pertaining to the art of measuring the human figure, or human remains.



## ANTHROPOMORPHITE.

**ANTHROPOMORPHISM**, *ăn'thrō-pō-mōr'fīzəm*: the application, in a figurative way, to God, of terms which properly relate to human beings. Thus, in the Holy Scriptures, we read of the eye, the ear, the arm, the hand of God; and of his remembering, forgetting, etc. This A. appears to arise of necessity from our incapacity of forming conceptions of things spiritual, or finding any terms in which to express them, except by analogies derived from things cognizable by our senses, so that even the language of adoration is borrowed from the familiar things of this world. It is evident that A. employed in an unguarded manner, or too grossly understood, might lead to most serious error; and a tendency has manifested itself at various times in the history of the Christian Church to ascribe to the Divine Being a form and parts like those of men. Thus, the Audæans (q.v.) or Audians, a Syrian monastic sect in the 4th c., were accused, and, it seems, justly, of holding that God was possessed of a human shape, and that, when the Bible said that 'God created man in his own image,' the words are to be understood of this shape literally. The same error was at a later period ascribed to the Waldenses, but there was no evidence of the justice of the accusation. A tendency to A. may indeed be regarded as always existing, and so requiring to be guarded against in the mind of every man; but the instances have been rare and isolated, although they have from time to time occurred, in which anthropomorphic views have been fully adopted and openly expressed among Christians. The error of the anthropomorphites has, however, found countenance from the speculations of philosophers. Hobbes, Forster, and Priestley ascribed to the Divine Being a sort of subtle body. Fichte, on the other hand, rejected the very doctrine of the personality of the Divine Being as anthropomorphic, and represented God as the *moral order of the universe*; and Schelling, Hegel, Feuerbach, and Schleiermacher substituted, or used terms which might be understood as substituting, for the objective personality of God a subjective consciousness of God in the human soul.—The term *Anthropopathism* is sometimes employed to denote the ascription to God of human affections and passions, although A., in its most general sense, includes this. The language of Scripture, in the many instances of this kind, must be interpreted according to the same general principles which are applicable in those of A. strictly so called, with the same discrimination of the figurative from the literal, and the same constant recognition of the absolute spirituality and unchangeableness of God; yet so that important truths conveyed by means of such language, and which it is probable could only be conveyed to us by such language, in accordance with our mental constitution may not be rejected or obscured.

**ANTHROPOMORPHITE**, n. *ăn'thrō pō mōr'fīt* [Gr. *ăn-thrōpos*, man; *morphē*, form, shape]: one who attributes a human form to the Deity. -**MOR'PHISM**, n. the doctrine. -**MOR'PHOUS**, a. pertaining to that which resembles a human form. **AN'THROPOMOR'PHIC**, a. -*mōr'fīk*, of or pertaining to. **AN'THROPOMORPHIS'TIC**, a. -*tīk*, having a tendency to attribute a human form to the Deity.

## ANTHROPOPATHISM—ANTIBRACHIUM.

**ANTHROPOPATHISM**, n. *ăn thrō-pŏp'ă-thĭzm* [Gr. *an-thrōpos*, a man; *páthos*, affection or feeling, passion]: the doctrine which ascribes human passions to the Supreme Being. **AN'THROPOPATH'IC**, a. *-pŏ-păth'ik*; or **AN'THROPOPATH'ICAL**, a. *-ik-ăl*, pert. to: subject to human passions. **ANTHROPOPATHY**, n. *ăn' thrō-pŏp'ă-thĭ*, human affections or passions as pert. to the Supreme Being.

**ANTHROPOPHAGI**, n. plu. *ăn' thrō-pŏf'ă-jĭ* [Gr. *anthrōpos*, a man; *phagein*, to eat]: cannibals; men that eat human flesh. See **CANNIBAL**. **AN'THROPOPHAGIN'IAN**, n. *-ă jĭn'-ĭ-ăn*, a cannibal. **AN'THROPOPH'AGOUS**, a. *-pŏf'ă-gŭs*, feeding on human flesh. **AN'THROPOPH'AGY**, n. *-pŏf'ă-jĭ*, the practice of eating human flesh.

**ANTHROPOTOMIST**, n. *ăn' thrō-pŏt'ŏ-mĭst* [Gr. *anthrōpos*, a man; *tomē*, a cutting]: an anatomist of human bodies.

**ANTHURIUM**, n. *ăn-thŭ'rĭ-ŭm* [Gr. *anthos*, a flower; *oura*, a tail]: in *bot.*, a genus of plants of the Arum family having their inflorescence in the form of spikes like tails.

**ANTHUS**, and **ANTHIDÆ**: see **PIPI**.

**ANTHYLLIS**: see **KIDNEY VETCH**.

**ANTI**, *ăn'tĭ* [Gr.]: a prefix, with its form **ANT**, signifies against or opposite; in place of.

**ANTIARIS**, and **ANTJAR**: see **UPAS**.

**ANTIBES**, *ăn-tĕb'* (anciently *Antipolis*): fortified sea-port in the dept. of the Alpes Maritimes, in the s.e. of Provence, France; lat. 43° 34' n., long. 7° 8' e.; on the e. side of a small neck of land called La-Garoupe, w. from the mouth of the Var; in a fertile district. The harbor is serviceable only for small craft. It is a military station of the third rank, has a naval school, and considerable trade in olives, dried fruits, salt-fish, oil, etc. The anchovies prepared at A. are held in high estimation. The environs of the town are beautifully adorned with gardens, vineyards, and orchards.

A. is a very old place, founded by a colony of Greeks from Massilia (Marseilles), of which it was a dependency. In the time of Augustus it was elevated to the rank of an Italian city, and many ruins still testify to its ancient prosperity. After the wreck of the old Roman empire, A. became subject to successive tribes of barbarians from the north. In the 9th c., it was destroyed by the Saracens; in the 16th c., it was fortified by Francis I. and Henry IV.; during the Austrian War of Succession, it sustained a siege of three months (1746). A. closed its gates against Napoleon on his return from Elba. The *Antibes Legion* was a body of foreign troops, chiefly French, formed at A. kept by the pope during the French occupation at Rome. Pop. (1891; 7,401.

**ANTIBILIOUS**, a. *ăn'tĭ-bĭl'yŭs* [Gr. *anti*, against, and *bilious*]: good for the cure of bilious complaints.

**ANTIBRACHIUM**, n. *ăn'tĭ-brăk'ĭ-ŭm* [Gr. *anti*, in front of; Gr. *brachĭōn*; L. *brachĭŭm*, the arm]: the fore-arm of the higher vertebrates, composed of the radius and ulna. **ANTIBRACH'IAL**, a. *-ĭ-ăl*, pert. to.



## ANTIC—ANTICHRIST.

**ANTIC**, a. *ăn'tík* [F. *antique*; OF. *antif*, ancient—from L. *antiqus*, old]: odd; fanciful: N. odd appearance; a buffoon; in *arch.*, a grotesque figure used as an ornament. **ANTICS**, n. plu. odd or extravagant gesticulations; grotesque and foolish actions. **ANTICLY**, ad. *ăn'tík-lî*. *Note.*—On the revival of art in the fourteenth and fifteenth centuries the ancient models were imitated in sculpture-work, and the copies called *antiques*; monstrous and caricature representations in sculpture became very common, and known by the same name; hence any grotesque figure in sculpture was called an *antique* or *anie*, figuratively transferred to grotesque contortions of body or conduct.

**ANTICHLORE**, *ăn'tî-klôr*: name given to commercial sodium sulphite by paper-makers. When the rags are reduced to a pulp, they are bleached by chloride of lime (bleaching powder), which thoroughly soaks the pulp, and is very difficult to wash out. The traces of chlorine thus left in the pulp pass into the manufactured paper, and tend to bleach the writing-ink which may be traced thereon. To free the pulp from the residue of the chlorine, some sodium sulphite is employed, and hence the name A., which literally signifies 'against (*anti*) chlorine.'

**ANTICHRIST**, n. *ăn'tî-krîst* [Gr. *anti*, against, and *Christ*]: a false Christ; an antagonist of Christ. **AN'TI-CHRIST'IAN**, a. *-krîst-yăn*, opposing the Christian religion, or opposite to it. The general notion of Antichrist as a power opposing itself to the reign of the Messiah, may be traced back beyond the Christian era. Its origin is perhaps to be found in the prophecy of Ezekiel (Ezkl. xxxviii. 2; see also Rev. xx. 8) concerning the doom of Gog and Magog. In accordance with the old saying, 'When need is sorest, help is nearest,' the Jews conceived that, immediately previous to the Messiah's reign, national adversity must be experienced in an extreme degree, and that an agent of Satan would appear, who must be overcome before prosperity could be restored. This agent was A. The idea is adopted in the New Test., although the term A. occurs in no place of Scripture except John I. and II. From such passages as the prophecies of the Saviour, Matt. xxiv. and Mark xiii., it has been inferred by some that probably the great truth which this conception was intended to shadow forth was similar to that illustrated in the life of 'the Man of Sorrows'—that only through tribulation and strife could the reign of the Messiah be established, that Christ's kingdom, like Christ himself, could be made perfect only through suffering. And with this the language of John in his epistles, and of Paul in passages which seem to embody the same idea, is supposed to accord. Nor is it regarded as a fatal objection to this opinion, that in the Apocalypse the Antichristian power or element is associated with the great heathen capital Rome, symbolically designated Babylon.

But this opinion neither has been nor is generally prevalent. The idea of A. early became associated with that of the Millennium (q.v.) retaining a form very similar to that

## ANTICIPATE.

which it had among the Jews before the advent of the Messiah; and popular opinion has always sought to find for it some actual and definite embodiment. In the 5th c., a popular delusion prevailed, founded on the passage in the Apocalypse, Rev. xvii. 8, that Nero was not dead and would return in the character of A. After the 16th c., a prevalent opinion among Protestants was that A. is the Rom. Cath. Church; an idea entertained even at an earlier period, as, for instance, by Ludwig of Bavaria, regarding Pope John XXII., by Occam, Wickliffe, and his pupil Cobham, and the Bohemian reformer Janow, and which seems to have prevailed to a considerable extent among the Hussites and other opponents of Rome. This opinion still lingering, but no longer largely advocated among the leaders of Protestant thought, has been powerfully opposed by Roman Catholic writers, as by Bossuet, who, in his comments on the Apocalypse, ably advocates the opinion that Pagan Rome was A. The opinions of Roman Catholics, however, are much divided concerning A., many maintaining that A. is yet to come and 'to raise the last persecution,' as 'no one has yet appeared to whom we can apply the character which the infallible Word of God declares shall be that of the real A.'—*Keenan's Catechism of the Christian Religion*.

The opinion prevalent among Protestants depends upon the identification of A. with the mystical Babylon of the Apocalypse, and with other symbolic representations in that book, of a power opposed to the cause of Christ, and also with the 'Wicked' one, the 'Man of Sin,' and 'Son of Perdition,' 2 Thess. ii. Thus it is still maintained by some that a definite embodiment of the idea of A. is to be sought in history, and that this is to be found in the Church of Rome, or rather in the papal power. And such Protestant advocates refer to the gradual growth and development of the errors which they regard as culminating in the Latin Church, as accordant with the declaration of the apostle Paul, 2. Thess. ii., that 'the mystery of iniquity doth already work,' and with that of John, 'even now are there many antichrists.'

There have been, however, among Protestants even from an early period eminent opponents of this opinion, among whom may be named Grotius. His own opinion was singular, that Caligula, the Roman emperor, was A. In the Greek Church, the term A. has been understood as especially applicable to Mohammed, or to the dominion of the Turks and Saracens. Almost every great or striking event—the arrival of the year 1,000; the beginning of the Crusades; the 'black death' and other plagues in the 14th c.; the career of Napoleon in 1805; and even the political movements of 1848–49—has suggested new interpretations of the passages of Scripture regarding A. See REVELATION OF JOHN.

Hitherto the interpretation of the Scripture texts relating to A. has not been instructive. 'Much error,' says Dr. Samuel Davidson, 'has arisen from mixing up Daniel's vision with those of the Apocalypse, because



## ANTICHRISTIANISM—ANTICIPATE.

they refer to different subjects. The apostle borrows characteristic features from Daniel's Antiochus Epiphanes, to fill out his picture of Nero. The combination of St. Paul's Man of Sin with St. John's antichristian Nero has also led to misapprehension. The idea is variously developed, according to the mental peculiarities and knowledge of those who entertained it. Vague and general at first, it was afterward narrowed, somewhat in the manner of the Messianic one. Its different forms show that it was no article of faith, no dogma connected with salvation. Less definite in the second epistle to the Thessalonians, it is somewhat specific in the Revelation. . . . The author of John's first epistle gave the idea of Antichrist a spiritual width, consistently with the whole direction of his epistle. In each case, however, the writers moved within their own times, their knowledge bounded by the necessary limits of the human intellect, so that their subjective views can hardly be accepted as the emanations of minds projecting themselves into the future with infallible certainty. What they express about Antichrist is their development of an idea which sprang out of Jewish soil. . . . It is the very individualizing of the A. idea which removes it from the sphere of actual realization.' These views, so far as they regard the Hebrew cast of the prophetic idea of A., and the national horizon which limited the scope of its imagery, are probably shared by the majority of recent biblical scholars. But, when the *personal* element is ruled out, and an abstract A. brought in to fill its place, in the interest of making the prediction more true to nature and to the reality of things, the whole vital force of the idea will, to many, seem to be taken away. Increasingly is it felt that in any great moral conflict the personal element is inevitable.—Compare Davidson's *Introduction to the Study of the New Testament*, I.; Renan's *L'Antéchrist*; Jowett's *Epistles of St. Paul to the Thessalonians*, etc., I.

ANTICHRISTIANISM, *ăn-tî-krist'yan-izm* [*antichristian*, and *ism*]: belief or conduct opposed to Christianity; opposition to the doctrine of Christ, or of the Christian Church.

ANTICHTHON, *ăn-tîk'thôn* [Gr. *anti*, opposite; *chthôn*, earth]: in Pythagorean astronomy, supposititious invisible planet that continually opposes the earth and eclipses the central fire, round which it supposedly revolved. Also, a dweller in an opposite hemisphere.

ANTICIPANT, a. *ăn-tîs'î-pant* [L. *anticipans*, taking beforehand]: anticipating; in anticipation of: term used of periodic fevers or other diseases in which the paroxysms arrive earlier than their normal period.

ANTICIPATE, v. *ăn-tîs'î-pât* [L. *anticipātus*, anticipated; *ante*, before; *căpiō*, I take; F. *anticiper*]: to do or take beforehand; to take first possession; to take before the proper time; to foretaste. ANTIC'IPA'TING, imp. ANTIC'-

## ANTICLIMAX—ANTI-CORN-LAW LEAGUE.

IPA'TED, pp. ANTIC'IPA'TION, n. -*pā'shŭn*, the act of anticipating; prevention. ANTIC'IPA'TOR, n. one who. ANTIC'IPATIVE, a. -*pā-tiv*, or ANTIC'IPATORY, a. -*pā-tēr-ĭ*, taking beforehand.—SYN. of 'anticipate:' to prevent; obviate; preclude; expect; preoccupy; foresee; forestall; precede.

ANTICLIMAX, n. *ăn'ti-klī'măks* [Gr. *anti*, opposite to; *klimax*, a ladder or staircase]: a figure of speech in which the ideas, instead of successively increasing in grandeur, sink lower.

ANTICLINAL, a. *ăn'ti-klī'năl* [Gr. *anti*, against; *klino*, I bend]: in *geol.*, applied to strata which dip in opposite directions in a roof-like form; opposite of *synclinal*.

ANTI-CORN-LAW LEAGUE: an association which concentrated the efforts of the free-trade party in Britain, and enabled them to carry the repeal of the corn-laws, and establish in practice the principle of free-trade. For the results thus accomplished, see CORN-LAWS: FREE-TRADE, etc. Associations to obtain the repeal of the corn-laws existed in several places before the embodiment of the League—one especially was founded in London in 1834. In 1838, Mr. Cobden and others took the opportunity of the periodical assemblages of the Manchester Chamber of Commerce for exposing the deleterious influence of the restrictive commercial policy on the manufactures and trade of the country. The friends of free-trade occasionally met in Manchester to discuss and promulgate their views; but it was in the beginning of 1839 that the strength of the party was first drawn to a focus, by the appointment of delegates from the manufacturing districts to go to London, and press their principles on the legislature. Mr. Charles Villiers, afterwards pres. of the board of trade, undertook the leadership of their cause in the house of commons, of which Mr. Cobden, who subsequently served it so effectively, was not then a member. Feb. 19, Mr. Villiers moved that the house resolve itself into a committee of inquiry on the corn laws; and again Mar. 12, he moved that certain manufacturers be heard by counsel at the bar of the house against the corn-laws, as injurious to their private interest. The former motion was rejected by 342 to 195; the latter, by 361 to 172. Immediately on the return of the delegates from their unsuccessful effort, the League was formed. Its constitution dates from 1839, Mar. 20, when resolutions were adopted, at a meeting in Manchester, for 'the formation of a permanent union, to be called 'The Anti-corn-law League,' composed of all the towns and districts represented in the delegation, and as many others as might be induced to form associations, and to join the League. The central office of the League was established in Manchester, having in charge the influencing of public sentiment by securing competent lecturers, by obtaining the co-operation of the public press, by correspondence with the local associations, and by various other means. The sum of £5,000 was put at the disposal of the central body, in whose deliberations a contribution of £50 entitled the giver to one vote. The League collected and distributed large sums



## ANTICOSTI—ANTIGONE.

of money. Just before its principles became triumphant in the free-trade legislation of 1846, it demanded a quarter of a million pounds, which would have been supplied had it been necessary.

The teachings of the League gained acceptance as presenting a scientific truth in political economy. A majority of the parliament who, in 1841, had been elected for the support of protection, were converted to free-trade, the conversion including the prime minister, Sir Robert Peel. The key-note to the literature of the League was struck by the beautiful logical exposition of free-trade in General Thompson's *Catechism of the Corn-laws*, which, with other tracts, was profusely dispensed over the country. To serve their cause in the same manner, the protectionist party, at a meeting held in the Duke of Somerset's house, 1844, Feb. 17, founded 'The Agricultural Protection Soc. of Great Britain'; but the exertions of this body seem to have helped rather than hindered. See FREE-TRADE: TARIFF.

ANTICOSTI, *ăn'ti-kōs'ti*: island in the Gulf of St. Lawrence, with lighthouses at different parts of the coast; between lat. 49° and 50° n., and long. 61° 40' and 64° 30' w. estimated 3,145 sq. m. Neither to the settler nor to the mariner is A. of value. It is destitute of harbors, the n. shore being mountainous, and the s. low and beset by shoals; while, to increase the danger, the neighboring currents are said to be capricious. The climate is severe; while the surface is an alternation of rocks and swamps. There are hardly any inhabitants save lighthouse-keepers and a few officials, about 600 in all. The island, attached to the Canadian prov. of Quebec, has considerable salmon, trout, cod, and herring fisheries, and is a resort for seal and bear hunting. Extensive peat deposits are found in Anticosti. Marl also occurs.

ANTICOUS, a. *ăn'ti-kūs* [L. *antīcus*, in front]: in bot., placed in front of a flower, as the lip of orchids.

ANTIDOTE, n. *ăn'ti-dōt* [Gr. *antīdōton*, a remedy—from *anti*, against; *didōnai*, to give]: a medicine to counteract the bad effects of poison; a remedy for any evil. See POISONS. ANTIDOTAL, a. *ăn'ti-dō'tāl*, or AN'TIDO'TICAL, a. *dō'ti-kāl*, expelling the effects of poison. AN'TIDO'TALLY, ad. *-tāl-ī*. AN'TIDO'TICALLY, ad. *-kāl-lī*.

ANTIDROMOUS, a. *ăn-tīd'rō-mūs* [Gr. *anti*, opposite to; *dromos*, a course]: running in the opposite direction, as spirals which run alternately in opposite directions; the opposite of *homodromous*.

ANTIETAM, *ăn-tē'tam*, BATTLE OF (Confederate name, SHARPSBURG, BATTLE OF): 1862, Sep. 17, on Antietam creek near Sharpsburg, Md., between the Union army under Gen. McClellan and the Confederate army under Gen. Lee. The strength of the opposing armies has been variously stated. Gen. McClellan reported his own at 87,164, and estimated Gen. Lee's at 97,445; Gen. Lee reported 40,000; the Richmond *Enquirer* credited him with 60,000; and Pollard's *Southern History of the War* estimated the Confederate force at 45,000 in the morning and 75,000 in

the afternoon. The movements of both armies had been spirited from Sep. 1. On the fourth, fifth, and sixth, Gen. Lee threw his forces across the Potomac near Leesburg, occupied Frederick, and possessed himself of the surrounding country. Gen. McClellan, eager to protect Washington and anxious to prevent a further invasion of Union territory, forced Lee to abandon Frederick on the 12th by interposing a strong force between the Confederates and the fords of the Potomac, Lee moving toward Hagerstown. While McClellan and Lee were watching each other here, a Confederate force under 'Stonewall' Jackson hastened to Harper's Ferry, and compelled its surrender with 12,000, to 13,000 prisoners, Sep. 15. On the 14th McClellan occupied Crampton's Gap and the heights of South Mountain, commanding the road to Hagerstown, and, a second time checking Lee's advance, forced him to retreat across Antietam creek to Sharpsburg. A portion of the Union army under Gen. Hooker followed in pursuit on the 16th, had a sharp engagement with the Confederates, and gained their object—a favorable position. Early the next morning Hooker forced the battle by attacking the Confederate left, while Gen. Burnside engaged the right. Hooker at first drove the left wing backward to a cornfield bordered by woods, and was bearing the brunt of the fighting when he was wounded and had to be carried from the field. Gen. Sumner then took command at this point, and though twice repulsed at the cornfield, the Union army succeeded in holding the position. On the Union left, Burnside was twice checked in attempting to cross the creek, but in the afternoon drove the Confederates back to a range of hills where several Confederate batteries had been posted. Ordered to secure these hills, he captured the first battery; but by this time Lee had so strengthened the second hill that Burnside reported he could not hold the ground already gained without reinforcements, and as these were not furnished him he was driven back to the bridge. Gen. French, commanding the centre of the Union line, pressed forward steadily toward the hills, but could not gain them; while Gen. Richardson with a div. of Sumner's corps, drove the Confederates from the river nearly to Sharpsburg. Darkness then put an end to the fighting for the day. An armistice to bury their dead was granted the Confederates the next day, and during the night they retreated to the right bank of the Potomac. McClellan reported his loss at 12,469, including 2,010 killed; the Confederates acknowledged a loss of 13,533 in their Md. campaign. McClellan in the campaign took 13 guns, 39 colors, more than 15,000 stand of arms, and more than 6,000 prisoners, without losing a gun or color.

ANTIFEBRIN, *n.* *ăn' tĭfĕb' rĭn* [L. *anti*, against; *febris*, fever]: a remedy to abate fever: see ACETANILIDE.

ANTIGONE, *ăn-tĭg'ō-nē*: several characters in Greek legend, (1) daughter of Œdipus by his own mother Jocasta, and sister of Eteocles and Polynices. She accompanied her father into exile, and after his death returned to Thebes. Eteocles, the king, had banished his brother



## ANTIGONUS--ANTIGUA.

Polynices, who, coming back with an army, engaged him in single combat. Both fell, and Creon, who after their death had become tyrant of Thebes, forbade their interment. When he learned that A. had buried Polynices, he shut her up in a tomb or cave where she died. A son of Creon, betrothed to A., killed himself when her fate became known. (See Sophocles's *Œdipus at Colonus* and *Antigone*); (2) daughter of Eurytion, wife of Peleus, who hanged herself on receiving a false report of her husband's marriage to Sterope; (3) daughter of Laomedon and sister of Priam, who audaciously compared her beauty to Juno's, and was punished by having her hair turned into snakes, which so tormented her that the gods in compassion changed her into a stork.

**ANTIG'ONUS** : name of many historical persons, of which the most celebrated was the son of Philip of Elymiotis, and one of the generals of Alexander the Great: B. C. 381-301. In the division of the empire which followed the death of his master, A. received the provinces of Phrygia-Major, Lycia, and Pamphylia. Being accused of disobedience by Perdiccas, who wished to gain possession of all the territories left by Alexander, A. entered into alliance with Craterus, Antipater, and Ptolemæus, and declared war against Perdiccas, B. C. 321. In the same year, Perdiccas was assassinated by his own soldiers; but A. carried on the war against Eumenes, to whom Perdiccas had given rule over Paphlagonia and Cappadocia. Eumenes, and afterwards Seleucus, who reigned in Syria, were deposed by A., whose ambition and cupidity grew beyond all bounds. He seized the treasures of Alexander kept at Ecbatana and Susa, which he refused to share with his allies, Ptolemæus, Cassander (son of Antipater), and Lysimachus. All the other generals now allied themselves against him, and a long series of contests took place in Syria, Phœnicia, Asia Minor and Greece, which ended with the battle of Ipsus, in Phrygia, when A. was slain in his eighty-first year.

**ANTIGONUS GONATAS**, *an-tig'ō-nūs gon'ă-tas* : King of Macedonia: reigned B. C. 277-244; d. B. C. 243: son of Demetrius Poliorcetes, king of Macedonia, and grandson of the great Antigonus. On his father's death, B. C. 283, various claimants for the throne appeared, and much confusion ensued, the result of which was that the royal power fell into the hands of Ptolemæus Ceraunus, who soon perished in a battle with the Gauls, when A. G. became ruler of the country (277 B. C.), and governed precariously in that age of intrigue, dissimulation, and violence, for 33 years. He was twice expelled from his dominions by a hostile force from Epirus, but found refuge and assistance in the Peloponnesus. The close of his career was comparatively peaceful.

**ANTIGUA**, *ân-tê'ga*: West India island, the most important of the Leeward Islands (see **ANTILLES**); residence of the gov.-in-chief of the British portion of the group; w. long., between 61° 44' and 61° 58'; n. lat., between 17° 2' and 17° 13'. It is about 18 m. across; 108 sq. m. It was first set

## ANTIHELIX—ANTILLES.

bled, 1632, having till then remained, in fact, uninhabited on account of the great scarcity of fresh water. It has twice suffered severely from earthquakes—1689 and 1843, and of hurricanes, the other heavy scourge of the group, A. has had its full share. Numerous islets, rocks, and shoals border the shore, so that, generally speaking, access is difficult and dangerous. But St. Johns, cap. and chief town, is at the head of a safe and capacious bay, which unfortunately, however, does not admit large vessels. English Harbor is, on the whole, a more commodious port, and has been selected as the station of the Royal Mail steam-packets. It is said to be capable of receiving the largest ships in the British navy.

A. is chiefly of tertiary formation. The s. and w. show grauwacke, porphyry, trap, breccia, amygdaloid, and basaltic greenstone; the n. and e. exhibit calcareous marl and coarse sandstone, interspersed with blocks of limestone; while the interior presents argillaceous strata and irregular beds of coarse flint.

Besides provisions, generally almost sufficient for its own consumption, A. produces large quantities of sugar, molasses, and rum. Total value of imports (1901) £121,347; of exports £112,508.

Immediately after the passing of the imperial statute for emancipation of slaves, the local legislature, rejecting the probationary state of apprenticeship, proclaimed unqualified freedom of the 30,000 slaves, for 1834, Aug. 1. Pop. (1901), with Barbuda and Redonda, 34,971, a decrease since 1891.

ANTIHELIX, n. *ǎnt'î-hêl'îks* [Gr. *anti*, opposite to, but here in the sense of 'before'; *helix*, anything twisted or convoluted, the ear]: the curved prominence parallel with, and in front of, the helix or external prominent rim of the auricle of the ear.

ANTILEGOMENA, *ǎn-tî-lê-gôm'ê-na*, n. plu. [Gr. *antilegomena*, things spoken against]: applied especially to certain books in the New Test., which were finally admitted into the canon, though not universally acknowledged in the early church. Such books included the now accepted Epistle to the Hebrews, II. Peter, II. and III. John, the Epistles of James and of Jude, and the Revelation. Rom. Cath. theologians classify these books under one head, calling them *deuterocanonical*, or forming a second canon [from Gr. *deutero*, second]. No New Test. canon is known to have been formed until the latter half of the 2d century.

ANTILLES, *ân-tîl'lêz* or *ôn-têl'*: term designating generally the whole of the West Indian Islands, except the Bahamas. Generally speaking, they stretch e. from the Gulf of Mexico to about the meridian of the Gulf of Paria; then s. to the Gulf of Paria itself; and lastly, w. to the Gulf of Maracaybo. Primarily, however, they are regarded not as three sections, but as two—the Greater A., to the n. and w.; and the Lesser, to the e. and s. This distinction, which obviously involves considerations of position as well as of



## ANTILLES.

magnitude, will be found to indicate also a difference of organic structure.

The Greater A., reckoning from the w., are: Cuba (independent), Jamaica (Brit.), Hayti (independent), and Porto Rico (U. S.). They extend, in w. long., from  $84^{\circ} 58'$  to  $65^{\circ} 40'$ , and in n. lat. from  $23^{\circ} 9'$  to  $17^{\circ} 40'$ —the higher of these two parallels being only  $21'$  or about 25 m. within the Tropic of Cancer. On the lowest estimate, the area is 70,000 sq. m. The Greater A. appear to be of primitive formation, presenting lofty granitic mountains. In Jamaica, however, there are many hills of calcareous origin.

The Lesser A. may be divided into two chains—the e., trending round from the e. of Porto Rico to the Gulf of Paria; and the s., stretching away in a direction nearly parallel with that of the Greater A., along the coast of Venezuela as far as the Gulf of Maracaybo. By the Spaniards, followed by some other nations, the latter chain is termed the Leeward Islands, and the former the Windward Islands. In English and French phraseology, however, the Leeward Islands are all those to the n. of  $15^{\circ}$  n. lat., and the Windward Islands all those s. of that parallel.

In the latter sense of the name, the Leeward Islands, reckoning from the n., come in nearly the following order: Virgin Islands (Danish and British), Anegada (British), Anguilla (British), St. Martin (French and Dutch), St. Croix (Danish), Saba (Dutch), St. Bartholomew (French), St. Eustatius (Dutch), Barbuda (British), St. Christopher's (British), Nevis (British), Antigua (British), Montserrat (British), Desseada (French), Guadeloupe (French), Marie Galante (French), Dominica (British). They extend in w. long. from  $65^{\circ} 30'$ , at the w. extremity of the Virgin Isles to  $61^{\circ} 23'$ , at the e. extremity of Dominica; and in n. lat. from  $18^{\circ} 48'$ , at the n. extremity of Anegada to  $15^{\circ} 10'$ , at the s. extremity of Dominica. See DANISH WEST INDIES.

The Windward Islands, reckoning from n. to s. and then from e. to w., are as follows: Martinique (French), St. Lucia (British), Barbadoes (British), St. Vincent (British), Grenadines (British), Grenada (British), Tobago (British), Trinidad (British), Testigos (Venezuelan), Margarita (Venezuelan), Tortuga (Venezuelan), Blanquilla (Venezuelan), Buen Ayre (Dutch), Curaçoa (Dutch), Aruba (Dutch). They extend in w. long. from  $59^{\circ} 20'$  at the e. of Barbadoes, to  $70^{\circ} 11'$ , at the w. of Aruba; and in n. lat. from  $11^{\circ}$ , at the s. of Margarita, to  $14^{\circ} 55'$ , at the n. of Martinique. Their entire area cannot exceed 1,500 sq. m. The Windward Islands, in the Spanish sense of the term, are otherwise called the Caribbees; and hence the sea which they cut off from the open Atlantic is called the Caribbean Sea (q.v.).

The Lesser A., as a whole, appear to be chiefly of coral formation, or of volcanic origin. Many of them contain extinct craters; and, though not destitute of harbors, their coasts are in a great measure inaccessible by reason of reefs.

The A. generally—but perhaps the Lesser more so than the Greater—are subject to hurricanes and earthquakes. Their principal productions are sugar, rum, cotton, coffee, etc. (see the titles of the individual islands).

## ANTILOPE—ANTIMONY.

The name A. is generally supposed to have been given by mistake to the West Indian Islands. Before the discovery of America by Columbus, a tradition existed that far to the w. of the Azores there lay a land called Antilla, whose position was vaguely indicated in the maps of the early cosmographers. Only eight months after Columbus's return, Peter Martyr writes that the islands which the great navigator had touched upon must be the Antillæ; and it is certain that Cuba and Hayti were known as such before a single link in the Caribbean chain was discovered.

ANTILOPE: see ANTELOPE.

ANTIMONY, n. *ăn'ti-mon-î* [mid. L. *antimo'nîum*: F. *antimoine*]: a metallic substance much used as an alloy; the chemical name is *stibium*. ANTIMONIAL, a. *ăn'ti-mô nî-ăl*, pert. to antimony, or containing it: N. the medicine. AN'TIMO'NIATE, n. *-nî-ăt*, a salt of antimonious acid. AN'TIMO'NIATED, a. *-ăt'ěd*, made of antimony or mixed with it. AN'TIMON'IC, a. *-îk*, or AN'TIMO'NIUS, a. *-nî-ûs*, of antimony: applied to the acids of antimony. ANTIMONITE, n. *ăn'ti-môn-î't'*, a salt of antimonious acid; in *min.*, the sulphuret of antimony which forms the common ore of that metal.

ANTIMONY—symb. *Sb* (Lat. *Stibium*): equiv. 122: a brittle metal of a flaky, crystalline texture, and bluish-white color. It is easily reduced to powder; when heated to 840° F., it fuses, and thereafter being allowed to cool, it solidifies in rhombohedral crystals, which are isomorphous with those of arsenic. Heated in a retort, where the oxygen of the air is excluded, as in an atmosphere of hydrogen, A. volatilizes as the vapor of the pure metal. When raised in temperature in contact with the air, it burns with a white light—combining with the oxygen of the atmosphere, and forming copious white fumes of the teroxide of A., or 'flowers of A.' The metal is a bad conductor of heat and electricity, but may be used, in conjunction with bismuth, in the construction of thermo-electric piles. Exposed to the air at ordinary temperatures, A. does not tarnish or rust; and this property, combined with the hardness of the metal and of its compounds, renders A. of essential service in the useful arts, in the construction of alloys, such as Britannia metal, type metal, and plate pewter. It is likewise employed in the preparation of the large concave mirrors used in astronomical observations; and in the casting of bells, to make them harder and whiter, and to give them a clearer and stronger sound.

A. sesquisulphide (stibnite, or gray A. ore),  $Sb_2S_3$ , which is found abundantly in Nevada, Borneo, and New Brunswick, and which is mined also in Hungary, Bohemia, Prussia, and Bavaria, is the principal source of A. It occurs usually in veins, is of leaden gray color, with metallic, sometimes iridescent lustre; it fuses readily. From stibnite metallic A. is obtained by fusion with charcoal that has been saturated with solution of sodium carbonate: or it may be reduced direct by roasting the sulphide with a mixture of cream of tartar and nitre, or with iron filings.



## ANTINOMIAN—ANTINOMIANISM.

The raw A., thus or otherwise obtained, requires calcination to free it from impurities—arsenic, iron, lead, copper, and sulphur. One of the simplest methods of purification is by charging each of a number of crucibles with the raw A. (or regulus), together with soda, common salt, and pure oxidized antimonial ore. On application of heat the foreign metals become oxidized and scorified, and 'star metal' or nearly pure A. is obtained.

The compounds of A. are numerous: with oxygen it forms (1) the *sesquioxide*, or *white A. ore*,  $\text{Sb}_2\text{O}_3$ , which enters into the composition of tartar emetic; (2) *antimonious acid*,  $\text{SbO}_3$ , which forms one of the components of Dr. James's powders; (3) *antimonic acid*,  $\text{Sb}_2\text{O}_5$ , a very insoluble compound, obtained by acting upon the metal with concentrated nitric acid. With sulphur, A. forms the *subsulphide*,  $\text{Sb}_2\text{S}_3$ , already referred to as a natural ore of the metal, and which when roasted at a temperature sufficient to fuse it, passes into the mixed teroxide and tersulphide of A. known commercially as the *glass* of A. A native oxysulphide of a pretty red color is called *red A. ore*. When the ordinary sulphide of A. is boiled with potash, or the carbonate of potash, it dissolves; and thereafter, on boiling, deposits a reddish-brown substance, known as *mineral kermes*. The liquid from which the deposit has fallen, if treated with hydrochloric acid, throws down an orange precipitate of *golden sulphide* of A.

There is also a chloride of A.,  $\text{SbCl}_3$ , prepared by heating sulphide of A. and hydrochloric acid together, and which has the common name of *butter* of A. It is generally obtained as an oily liquid, of the consistence of melted butter, and of a golden yellow color. Mixed with olive oil, it is used by gun-makers as *bronzing salt*, to impart a yellow color to gun-barrels. The surface of the metal is afterwards polished by a burnisher, or coated with a varnish.

The various compounds of A. are used as medicinal agents, both in human and veterinary practice, especially the *tartar emetic*, a double tartrate of A. and potash, and tartaric acid,  $(\text{KSBOT})_2\text{H}_2\text{O}$ ; this is the active ingredient in antimonial wine. Several cases have occurred where tartar emetic has been used criminally as a poison.

Basil Valentine, in his *Triumphant Chariot of Antimony*, says: 'The shortness of life makes it impossible for one man thoroughly to learn antimony, in which every day something new is discovered.'

**ANTINOMIAN**, n. *ăn'tĩ-nō'mĩ-ăn* [Gr. *anti*, against; *nōmos*, law]: one who denies that the moral law is binding on Christians, and affirms that faith alone is necessary to salvation: **ADJ.** relating to. **AN'TINO'MIANISM**, n. *-izm*, the tenets of. **ANTINOMY**, n. *ăn-tĩn'ō-mĩ*, or *ăn'tĩ-nō-mĩ*, the opposition of one law or rule to another: see **KANT**, **IMM'L**.

**ANTINOMIANISM**, *ăn'tĩ-nō'mĩ-ăn-izm*: the doctrine or opinion that Christians are freed from obligation to keep the law of God. It is generally regarded by the advocates of the doctrine of justification by faith, as a monstrous abuse and perversion of that doctrine, upon which it usually professes to be based. From several passages of the New

## ANTINOMIOUS.

Testament, as Rom. vi., and 2 Pet. ii. 18, 19, it seems that a tendency to A. had manifested itself even in the apostolic age; and many of the Gnostic sects were really antinomian, as were probably also some of the heretical sects of the middle ages; but the term was first used at the time of the Reformation, when it was applied by Luther to the opinions advocated by John Agricola. Agricola had adopted the principles of the Reformation; but in 1527 he found fault with Melanchthon for recommending the use of the law, and particularly of the ten commandments, in order to produce conviction and repentance, which he deemed inconsistent with the gospel. Ten years later, he maintained in a disputation at Wittenberg, that as men are justified simply by the gospel, the law is in no way necessary for justification or for sanctification. The 'Antinomian Controversy' of this time, in which Luther took a very active part, terminated in 1540 in a retraction by Agricola; but views more extreme than his were afterwards advocated by some of the English sectaries of the period of the Commonwealth; and, without being formally professed by a distinct sect, A. has been from time to time reproduced, as a tendency, with various modifications. It ought, however, to be borne in mind, that the term A. has no reference to the *conduct*, but only to the *opinions* of men; so that men who practically disregard and violate the known law of God, are not therefore antinomians; and it is certain enough that men really holding opinions more or less antinomian, have in many cases been men of good life. It is also to be observed that the term A. has been applied to opinions differing very much from each other. In its most extreme sense, it denotes the rejection of the moral law as no longer binding upon Christians; and a power or privilege is asserted for the saints to do what they please without loss of their sanctity; it being maintained that to them nothing is sinful; and this is represented as the perfection of Christian liberty. But besides this extreme A., than which nothing can be more repugnant to Christianity, there is also sometimes designated by this term the opinion of those who refuse to seek or to see in the Bible any positive laws binding upon Christians, and regard them as left to the guidance of gospel principles and the constraint of Christian love; an opinion which, whatever may be thought of its tendency, is certainly not to be deemed of the same character with the other. Probably, the A. that does not arise out of a dislike of morality, usually originates in mistaken notions of Christian liberty, or in confusion of views as to the relation between the moral law and the Jewish law of ceremonial ordinances.

ANTINOUS, *ăn-tĩn'ō-us*: a beautiful youth of Claudopolis, in Bithynia. He was page to the emperor Hadrian, and the object of his extravagant affection, accompanying him in all his travels, but was either drowned accidentally in the river Nile, or, as some suppose, committed suicide, in 122, from a loathing of the life that he led. His memory and the grief of the emperor were perpetuated by many statues and bass-reliefs, of which several are very beautiful, especially two now in Rome—one found in the baths, and the



## ANTIOCH.

other in the villa of Hadrian. 'In all figures of A.,' says Winckelmann, 'the face has a rather melancholy expression; the eyes are large with fine outlines; the profile is gently sloped downwards, and the mouth and chin are especially beautiful.' The city of Besa, in the Thebais, near to which A. was drowned, was also rebuilt by Hadrian, and the name of Antinoöpolis conferred upon it, in memory of his favorite. A. was further enrolled among the gods, and temples erected to him in Egypt and Greece.

ANTIOCH, *ān'tī ōk*: ancient cap. of the Greek kings of Syria; the most magnificent of the 16 cities of that name built by Seleucus Nicator (reigned B.C. 306-280). Its situation was admirably chosen. The river Orontes, issuing from the mountains of Lebanon, flows n. as far as the 36th parallel of lat., and then s.w. into the Levant. On the left bank of the river, after it has taken this last direction, and at a distance of 20 m. from the sea, lay the famous city, in the midst of a fertile and beautiful plain, 10 m. long by five broad. By its harbor, Seleuceia, it had communication with all the maritime cities of the West, while it also became an emporium for the merchandise of the East; for behind it lay the vast Syrian desert, across which travelled the caravans from Mesopotamia and Arabia. On the n. the plain of A. is bounded by the mountain-chain of Amanus, connected with the s.e. extremity of Mount Taurus; and on the s., which is more rocky, by the broken declivities of Mount Casius, from which the ancient town was distant less than two miles. In early times, a part of the city stood upon an island, which has now disappeared. The rest was built partly on the plain, and partly on the rugged ascent towards Mount Casius. The slopes above the city were covered with vineyards, while the banks of the river displayed, as they do even at the present day, a gorgeous profusion of eastern fruit-trees. The ancients called it 'A. the Beautiful,' 'the Crown of the East,' etc. It was a favorite residence of the Seleucid princes and of wealthy Romans, and was famed throughout the world for the abundance of its conveniences and the splendor of its luxury. It received from Strabo the name of *Tetrapolis*, on account of three new sites having been successively built upon, and each surrounded by a wall. Its public edifices were magnificent. The principal were: the Palace; the Senate-house; the Temple of Jupiter, burnished with gold; the Theatre, Amphitheatre, and Cæsarium, besides an aqueduct, a public promenade, and innumerable baths. At the beginning of the Roman empire, it was as large as Paris, and for many generations after continued to receive numerous embellishments from the emperors. Nor did its glory fade immediately after the founding of Constantinople, for though it then ceased to be the first city of the East, it rose into new dignity as a Christian city. Ten councils were held in it. Churches sprang up exhibiting a new style of architecture, which soon became prevalent; and even Constantine himself spent a considerable time here, adorning it, and strengthening its harbor, Seleuceia. The Antiochenes themselves, however, brought about the ruin of their beautiful

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city. They were famous, above all other people in ancient times, for their biting and scurrilous wit, and for their ingenuity for devising nicknames; and when the Persians, under Chosroes invaded Syria in 538, the Antiochenes could not refrain from jesting at them. The Persians took ample revenge by the total destruction of the city, which, however, was rebuilt by Justinian. The next important event in its history was its conquest by the Saracens in the 7th c. In the 9th c. it was recovered by the Greeks under Nicephorus Phocas, but in 1084 it again fell into the hands of the Mohammedans. The Crusaders besieged and took it, 1098, June 3. At the close of the 13th c., the sultan of Egypt seized it; since then it has undergone a variety of vicissitudes, and at present forms a portion of Syria, in the eyalet of Aleppo. Its modern name is *Antakieh*. It exhibits almost no traces of its former grandeur, except the ruins of the wall built by Justinian, and of the fortress erected by the Crusaders. Its manufactures are few and unimportant. In 1872, A. was mostly destroyed by an earthquake, and the pop., which was then estimated about 17,000, was in consequence greatly reduced.

ANTIOCHUS, *ăn-ti'ô-kûs*: a common Greek name, borne by thirteen kings of Syria, four kings of Commagene (a small country between the Euphrates and Mount Taurus), and many other persons of note (see Smith's *Dictionary of Greek and Roman Biography*).

ANTIOCHUS SOTER, the first of the Syrian dynasty, or Seleucidæ, as they were called from their founder: prob. B.C. 324–261, was the son of Seleucus, the general and one of the successors of Alexander. A. was the fruit of one of those marriages which Alexander celebrated at Susa between his generals and the princesses of Persia. His mother's name was Apama. From this fact we gather the probable date of his birth. For the earlier career of A., see SELEUCUS. On the murder of his father, B.C. 280, A. succeeded him in his dominions, but he afterwards permitted Antigonus Gonatas to retain possession of Macedonia on his marrying Phila, a daughter of Seleucus. A. was much occupied in wars with the Gauls, who invaded Asia Minor, and, on one occasion is said to have gained a victory over them by the help of his elephants, from which circumstance he derived the name of Soter (Saviour). He was killed in a battle with the Gauls, and was succeeded by his son A. II. This A. is mentioned in the Book of Daniel (xi. 6) as the king of the north—the king of the south being Ptolemy, whose daughter, Berenice, A. had been compelled to marry. On the death of Ptolemy, A. recalled his former wife, Laodice; but she, in revenge for the insult which she had received, caused A. to be murdered, along with Berenice and her son. A. lost the provinces of Parthia and Bactria.

ANTIOCHUS III., surnamed the Great, the most distinguished of the Seleucidæ, was the son of Seleucus Callinicus, and grandson of A. II.: d. B.C. 187. In his earlier wars with Ptolemy Philopator, A. was generally successful; and though defeated in a great battle near Gaza, he afterwards, by his victory over the Egyptian general, Scopas, obtained



## ANTIPAROS.

entire possession of Palestine and Cœle-Syria. In this war he was assisted by the Jews, to whom he granted many privileges. Fearing the power of the Romans, A. at length concluded a peace with Egypt, betrothed his daughter Cleopatra to the young king Ptolemy, and gave her Cœle-Syria and Palestine as a dowry. The formidable enemy which he thus hoped to escape encountered him at a later period of his career. Having conquered Philip of Macedonia, the Romans no longer dreaded a war with A., and accordingly sent him an embassy, demanding the surrender of the Thracian Chersonese, and of the places which he had conquered from Ptolemy, whose guardian the Romans had become. He was entirely defeated by the consul Acilius Glabrio at Thermopylæ, B.C. 191, and was compelled to return to Asia. Having a second time tried the fortune of war, he was defeated by Scipio, who had crossed over into Asia; and very severe terms were imposed on him. He found so much difficulty in raising money to pay the tribute demanded by the Romans, that he was led to plunder a temple in Elymais, when the people rose against him, and killed him. The fate of A. was foretold in the Book of Daniel (xi. 18, 19).

ANTIOCHUS IV., surnamed EPIPHANES: (reigned B.C. 175–164): by his tyranny and sacrilege excited the Jews to a successful insurrection under their leaders, Mattathias, Judas Maccabæus, and the other members of that heroic family. The monstrous life of A. is recorded in the books of the Maccabees.

ANTIOCHUS XIII., surnamed ASIATICUS, the last of the Seleucidæ, was deprived of his kingdom by Pompey, who reduced Syria to a Roman prov., B.C. 65.

ANTIPAROS, *ăn-tîp'ă-rôs*: (anciently called *Olearos* or *Oliaros*): one of the Cyclades Islands, celebrated for a stalactitic cave. It is separated from Paros by a narrow strait, and forms a part of the eparchy of Naxos. A. is 7 m. in length by about 3 in breadth; it is scantily supplied with water, but the flats in the n. and w. are moderately fertile. Corn and wine are cultivated, but not largely. The principal occupation of the inhabitants is fishing. From Kastron, the only village in the island, the distance to the celebrated grotto is about an hour and a half's ride. This wonderful cave is not alluded to by any Greek or Roman writer whose works are extant, but must have been visited by the curiosity-hunters of antiquity, for, in 1806, Col. Leake deciphered a Hellenic inscription which contained the names of those who had descended into it in ancient times. It is situated in the side of a mountain on the s. coast of the island, which is described as a mass of white marble. The top or entrance of the cave has a striking appearance; but the sloping descent is rather dangerous, on account of the cord by which the traveller holds being extremely slippery from constant humidity. The bottom once reached, and the grotto entered, there is presented to the eye a dazzling specimen of stalactitic formation—the roof, floor, and walls of the various chambers, all glittering with the most gorgeous incrustation, though it is said that the smoke of

## ANTIPAS—ANTIPATER.

the torches, and the constant fingering of visitors, are sully-  
ing the primitive purity of the massive columns. It is be-  
lieved that there are other caves of equal splendor in the  
vicinity not yet discovered. The height of the known cav-  
ern is 80 ft.; its length and breadth more than 300; but it  
seems the eye can only take in at once a length of 150 ft.,  
and a breadth of 100. The grotto was first made known to  
the modern world in 1673, by the then French ambassador  
to the Porte, M. de Nointel. Pop. of A. abt. 500.

ANTIPAS: see HEROD ANTIPAS.

ANTIPATER, *ăn-tîp'ă-ter*: d. B.C. 318 or 319: one of the  
generals and confidential friends of Philip, king of Mace-  
don: the most celebrated of the many who bore the name  
A. in antiquity. When Alexander led his troops into Asia,  
he left A.—who, with Parmenion, had endeavored to dis-  
suade him from the expedition—as governor of Macedonia.  
A. discharged the duties of this office with great ability,  
suppressing the insurrections in Thrace and Sparta; but  
Olympias, the mother of Alexander, who entertained a dis-  
like to A., prevailed on her son to appoint Craterus as regent  
of Macedonia. Alexander, prompted also, it is supposed,  
by his own jealousy of A., consented, but died before the  
change was carried into effect; and A. was left to share with  
Craterus the government of Alexander's territories in Eu-  
rope. The government of Macedonia was assigned to him;  
and soon after, he was called upon to defend himself against  
an alliance of the Grecian states. With the assistance of  
Craterus—on whom he afterwards bestowed his daughter  
Phila in marriage—and to a certain extent of Leonnatus, he  
succeeded in reducing the allies to subjection. Democracy  
at Athens was abolished, and a garrison admitted into  
Munychia, and the leaders of the popular party put to death.  
When Demosthenes was summoned to the presence of A.,  
he took poison, which for some time he had been carrying  
on his person, and died in the temple of Poseidon, B.C.  
322. This war was followed by another with Perdiccas, who  
was also his son-in-law, in which A. was again successful.  
After the murder of Perdiccas in 321, A. was appointed to  
the supreme regency of the kingdom, and the guardianship  
of Alexander's children. He died at an advanced age, leav-  
ing the regency to Polysperchon, to the exclusion of his  
own son Cassander.

Others of this name were: 1. A., second son of Cassander,  
king of Macedonia, who lived B.C. 3d c.—2. A., the father  
of Herod the Great. He lived in the days of Pompey and  
Julius Cæsar, was a firm friend of the Romans, and about  
B.C. 47 was appointed procurator of Judea. He was poisoned  
in 43 by one whose life he had twice saved.—3. A., grand-  
son of the former, and son of Herod the Great by his first  
wife Doris, a worthless prince, perpetually conspiring against  
the life of his brothers, until his trial and condemnation at  
Jerusalem before Quintilius Varus, the Roman governor of  
Syria. He was put to death in prison five days before  
Herod died, and in the same year with the massacre of the  
innocents at Bethlehem.



## ANTIPATHY.

**A.** was the name also of various eminent men in ancient times—physicians, philosophers, historians, poets, mathematicians, and grammarians.

**ANTIPATHY**, n. *ăn-tîp'ă-thî* [F. *antipathie*, antipathy—from Gr. *antipatheî'a*—from *anti*, against; *pathos*, feeling]: a feeling of hatred; natural aversion; dislike. **ANTIPATHET'IC**, a. *-ik*; or **AN'TIPATHET'ICAL**, a. *-ik-ăl*, having a constitutional aversion to a thing.—**SYN.** of 'antipathy': hatred; aversion; enmity; repugnance; ill-will; rancor; malice; malevolence; dislike; disgust; distaste; opposition; contrariety.

**ANTIPATHY**: term applied to a class of disagreeable sensations felt by some individuals regarding things innocuous or agreeable to the majority of mankind. These peculiarities are no doubt sometimes acquired in early life by injudiciously terrifying children with some object—the mental impression becoming permanent. A large class of persons have an **A.** to animal food, and from childhood refuse to taste it. In others, the aversion is limited to one kind of meat, as veal or pork; others are averse to eggs or milk. Nor is this feeling a conscious caprice, which an exertion of the will might remove; for it is generally found that contact with the object of the **A.** is resented by the bodily economy, and symptoms of poisoning are rapidly produced. Some are affected with these symptoms who have no mental aversion to the article. We read of a countess who had a liking for beef-udder, but directly it touched her lips they became swollen. There is also the case of a boy, who, 'if at any time he ate of an egg, his lips would swell, in his face would rise purple and black spots, and he would froth at the mouth.' Some medicines affect particular persons dangerously, even when given in very minute doses: a single grain of mercury has been known to induce a profuse salivation, with destruction of the jaw-bones. On others, medicines have a peculiar effect—astringents may purge. Many persons suffer with the most distressing irritation of the nasal and palpebral mucous membranes, produced by the exhalations arising from the fields during the inflorescence of the hay-crop. In others, an asthmatic condition is induced by the same cause. The air of some places has a similar influence on individuals: one gentleman was always attacked with asthma if he slept in the town of Kilkenny, and another rarely escaped a fit of that complaint if he slept anywhere else.

The most remarkable antipathies are those affecting the special senses. Nearly all persons have a loathing at reptiles, but some few *faint* on *seeing* a toad or lizard, others on seeing insects. 'The Duke d'Épernon swooned at sight of a leveret—a hare did not produce the same effect. Tycho Brahé fainted at sight of a fox, Henry III. of France at that of a cat, and Marshal d'Albert at a pig.'—*Millingen*.

*Hearing* a wet finger drawn on glass, the grinding of knives, or a creaking wheel, is sufficient to produce fainting in some. *Smelling* musk or ambergris throws some into convulsions; and we have seen how articles of food affect

others—often, no doubt, owing to perverted taste. The *touch* of anything unusually smooth has the same effect sometimes. Zimmerman records the case of a lady who was thus affected by the feeling of silk, satin, or the velvety skin of a peach. See IDIOSYNCRASY.

ANTIPERIODICS, *ăn'ti-pē-rĩ-ōd'iks*: drugs that relieve or cure diseases of periodic occurrence—as ague and some forms of neuralgia. Cinchona and its alkaloids are A.

ANTIPERISTALTIC, a. *ăn'ti-pēr-ĩ-stăl'tik* [Gr. *anti*, against, *peristaltikos*, drawing together all round—from *peri*, around, *stello*, I send]: applied to the vermicular contraction of the intestinal tube when that takes place in direction from behind forwards. ANTIPERISTALSIS, n. *-stăl sis*, the inversion of the peristaltic motion of the intestines.

ANTIPHLOGISTIC, a. *ăn'ti-flō-jĩs'tik* [Gr. *anti*, against, *phlogizo*, I consume or burn up]: applied to medical treatment intended to subdue inflammation; such as blood-letting, purgatives, low diet, etc.: N. a medicine that checks inflammation.

ANTIPHON, *ăn tĩ-fŏn*: b. Rhamnus, Attica, B.C. 480; son of Sophilus, the Sophist; earliest of the ten Attic orators in the Alexandrine canon: in his youth, the reputation of Gorgias, the most showy and insincere of all the Greek rhetoricians, was at its height. A. soon became convinced of the worthlessness of that oratory which the fashion of the time so highly valued, and resolved to introduce a new and better kind. He labored to make his arguments clear, solid, and convincing, so that it might be impossible for the judges who listened to the speeches he wrote to refuse their assent to his propositions. His success was unmistakable. Although he never made a public appearance as a pleader in the courts of justice, but contented himself with writing speeches for others to deliver, he acquired great influence, which he did not fail to exert for the furtherance of his political principles. To him must be attributed the overthrow of the Athenian democracy (B.C. 411), and the establishment of the oligarchical government of the Four Hundred; for although Pisander figured prominently before the people in this revolution, the whole affair, according to Thucydides—one of A.'s pupils in oratory, and a man admirably fitted to judge of such a point—was secretly planned by him. The oligarchical government did not prosper. Dissensions quickly broke out among the Four Hundred, and six months after, Alcibiades, the brilliant demagogue, was recalled. A. was brought to trial for treason, in having attempted to negotiate peace with Sparta. He is said to have made a noble defense of himself. Thucydides affirms that an abler was never made by any man in a similar position. It was his first and last oration. He was condemned to death; his property was confiscated, his house razed to the ground, his remains forbidden interment in Attica, and his children forever declared incapable of enjoying civic privileges. Of the 60 orations of A. which the ancients possessed, only 15 have come down to us. Three



## ANTIPHONY—ANTIPODES.

of these are written for others, and are greatly admired for their clearness, purity, and vigor of expression; the remaining 12 appearing to have been intended as specimens of school rhetoric for his pupils, are not so highly esteemed.

**ANTIPHONY**, n., or **ANTIPHONE**, n. *ăn-tĩf ô-nĩ* [Gr. *antĩphōnē*; mid. L. *antĩphōna*—from Gr. *antĩ*, opposite; *phōnē*, sound: F. *antiphone*: AS. *antefen*]: the alternate singing of two choirs. **ANTIPHONAL**, a. *ăn-tĩf ô-nāl*, pertaining to: N. a book of antiphons. **ANTIPHON**, n. *ăn'tĩ-fôn*, the hymn sung in parts by turns; same as *antiphony*; the chant of alternate singing in choirs; the repeating, chanting, or singing of versicles or parts alternately.

**ANTIPHONY**, or **ANTIPHONE**: among the ancient Greeks, a species of musical accompaniment in the octave, by instruments or voices, in opposition to that executed in unison, which they called *Homophony*. A. (often called **ANTIPHON**) is also a species of sacred song, sung by two parties, each responding to the other; a practice in the early ages of the Hebrews, Greeks, and Romans. Many of the Psalms of David show that antiphonal singing was then in use. Its introduction into the Greek Church is ascribed to Ignatius, Bishop of Antioch, 2d c.; and Ambrosius, Bishop of Milan, is said to have introduced it into the Western Church, 4th c. The dividing of the antiphonies into verses, with rules regarding the same, is attributed to Pope Cœlestin in 432. Pope Gregory I., 590, prepared the first regular *Antiphonarium* (see *Durandi Rationale Divinorum Officiorum*, Mainz, 1459). It was early a custom, which became common after the 13th c., to date deeds with the beginning words of the A. (*Intritus*), which in those times served for the day of the month and of the week. The Reformed Christian Churches of Germany and England have retained a certain degree of antiphonal singing.

**ANTIPHHRASIS**, n. *ăn-tĩf' ră-sĩs* [Gr. *antĩ*, opposite; *phrasis*, a form of speech]: the use of words in a sense opposite to their proper meaning; irony. **AN'TIPHRAS'TICAL**, a. *-tĩ-kāl*. **AN'TIPHRAS'TICALLY**, ad. *-kāl-ĩ*.

**ANTIPODES**, n. plu. *ăn-tĩp' ô-dēz* [Gr. *antĩ*, opposite; *podes*, feet]: those who live on the opposite side of the globe, and whose feet are directly opposite to those of the speaker; the country occupied by such. **ANTIPODE**, n. *ăn'tĩ-pōd*, one who lives on the opposite side of the globe. **ANTIPODAL**, a. having the feet directly opposite. *Note.*—As the singular **ANTIPODE**, *ăn'tĩ-pōd*, is now in use, there may be no good reason for objecting to *ăn'tĩ-pōdz* as an alternative pronunciation of the plural.

**ANTIPODES**, in Geography: inhabitants of any two opposite points of the globe, or in other words, the dwellers at the opposite extremities of any diameter of the earth. From this primary relation, there necessarily arise many secondary relations. A. must be on one and the same meridional circle, separated from each other by half the circumference. Being on one and the same meridional circle, they must differ in long. exactly 180°. with the exception of the

## ANTIPOPE.

poles themselves, as having no longitude at all: and being separated from each other by half the circumference, they must be equidistant from the equator in opposite directions. Take New York, as an example in lat.  $40^{\circ} 42' 33''$  n., and long.  $74^{\circ} 0' 3''$  w.; its A. must be in lat.  $40^{\circ} 0' 3''$  s. and in long.  $254^{\circ} 0' 3''$  w., or rather in  $90^{\circ} 18' 27''$  e., which is merely an undistinguishable spot in the Indian Ocean. Take, as another example, London, in lat.  $51^{\circ} 30'$  n., and long.  $0^{\circ} 5'$  w. Its A. must be in lat.  $51^{\circ} 30'$  s., and in long.  $180^{\circ} 5'$  w., or rather  $179^{\circ} 55'$  e.—coinciding nearly with a small island to the s. e. of New Zealand. This small island, in honor rather of London than of itself, has appropriated the term A. as its own peculiar name.

Between A. in general there necessarily exist also other secondary relations. With reference to the earth's daily rotation, the noon of the one side must be the midnight of the other; while, with regard to its annual revolution, the summer and the autumn of the one side must be the winter and the spring of the other. With respect, however, to the former contrast, some explanation may be required. This, for instance, being Wednesday in London, was last midnight in that city the noon of Tuesday or of Wednesday at A. Island? The answer is, that, according to circumstances, it may be held to be either one or the other. In going eastward—that is, in meeting the sun—one, from day to day, anticipates every noon and every midnight in the proportion of 4 min. of time to  $1^{\circ}$  of long., or of 12 hours of time to  $180^{\circ}$  of long.; so that, on reaching A. Island from London by the Cape of Good Hope, the middle of Tuesday night, by Greenwich reckoning, is actually regarded on the spot as the noon of Wednesday. In going westward—that is, in leading, as it were, the sun—one, from day to day, postpones every noon and every midnight in the same proportion as above; so that, on reaching A. Island from London by Cape Horn, the middle of Tuesday night, by Greenwich reckoning, is actually regarded on the spot as the noon of Tuesday. In fact, navigators in opposite directions, meeting at any intermediate point whatever of the earth's circumference, always differ in their computation of time by a whole day, or 24 hours. In two cases, this has been permanently exemplified: the Spaniards at the Philippines, who have come from the e. are a day behind the Portuguese in Macao, who have come from the w.; while, on the n.w. coast of America, the Russians from the w. were a day in advance of the British from the east.

ANTIPOPE, n. *an'ti-pōp* [Gr. *anti*, against, and *pope*]: a pontiff elected in opposition to the pope canonically chosen. The first A. is reputed to be Felix during the pontificate of Damasus (366–384). Several emperors of Germany set up popes against those whom the Romans had elected without consulting them. Otho the Great displaced successively two bishops of Rome; and when Sylvester III. had expelled the simoniacal and profligate pope Benedict IX., Conrad II. king of Germany, brought back this worthless pastor, who hastened to sell his dignity to Gregory VI. There were now consequently, three popes, and their num-



## ANTI-PYRETIC.

ber was increased to four by the election of Clement II. in 1046. Shortly after, Alexander II. found a rival in Honorius II.; and in 1080 the same unseemly spectacle was witnessed, when Henry IV., emperor of Germany, elevated to the papal chair Guibert of Ravenna, under the title of Clement III., in opposition to his implacable adversary, Gregory VII. But after the death of Gregory, Clement was himself opposed successively by Victor III. and Urban II., and at last died at a distance from Rome, having just beheld the exaltation of Pascal II. as the successor of Urban. During the 12th c. there were several antipopes, such as Gregory VIII. and Honorius III. On the death of the latter, France began to intermeddle in these disgraceful strifes, and upheld the cause of Innocent II. against Anaclet; while the kings of Sicily, on the other hand, more than once set up a pontiff of their own against the choice of the emperors. Between 1159 and 1378, there were four antipopes; but the most remarkable epoch is 'the great schism of the West,' produced by these rivalries in 1378—a schism which divided the church for fifty years. It broke out after the death of Gregory XI., at the election of Urban VI., whom the voice of the Roman people, demanding an Italian pope, and not one who should fix his pontificate, like several of his predecessors, at a distance from Rome, had elevated to the papal throne. The French cardinals objected, withdrew to Provence, and elected a new pope, under the name of Clement VII., who was recognized by France, Spain, Savoy, and Scotland; while Italy, Germany, England, and the whole n. of Europe, supported Urban VI. These two popes excommunicated each other; nor did they even fear to compromise their sacred character by the most cruel outrages and the most odious insults. The schism continued after their death, when three popes were elected by different parties, all of whom were deposed by the Council of Constance in 1415, and Cardinal Colonna elected in their room, under the title of Martin V. The last A. was Clement VIII. —See INFALLIBILITY OF THE CHURCH: POPE.

**ANTI-PYRETIC**, n. *ăn'ti-pî-rêt'ik* [Gr. *anti*, against; *puretos*, fever]: in *med.*, an agent to reduce the bodily temperature in fever. Such agents are in two classes: (1) those which lessen heat production; (2) those which increase the loss of heat. In the first class are such drugs as quinine, salicylic acid and its salts, and some of the essential oils, eucalyptol, thymol, etc., which lessen production of heat by modifying tissue change: also such drugs as aconite and digitalis which influence the production of heat through the circulation. The 2d class is divided into (a) those which by dilating the cutaneous vessels permit increased radiation, e.g. alcohol, antipyrin, phenacetine, etc.; (b) those which by increasing perspiration tend to loss of heat by evaporation, e.g., opium, ipecacuanha, nitrous ether, etc.; (c) those that abstract heat from the body, e.g., ice to the surface, cold bath, etc. **ANTI-PYRIN**, or **ANTI-PYRINE**, white crystalline powder, tasteless and soluble in water; dimethyl-oseychiniane, formula  $C^{11}H_{12}N^2O$ ; product of the destructive distillation of coal-tar oil,

## ANTIQUARIES—ANTIQUITY.

It is one of the most efficient febrifuges, and not harmful when administered by a competent physician. Serious results and even death have followed its careless use, due to its depressing action on the heart. It is useful whenever it is desirable to reduce the bodily temperature, and in painful affections of the nervous system. The majority of patent nostrums for relief of headache contain either A. or acetanilid, and should therefore be avoided, as the ingestion of such powerful drugs in unknown quantities may produce very serious symptoms much worse than the primary trouble.

ANTIQUARIES, SOCIETY OF: see ARCHÆOLOGY.

ANTIQUE, *ăn-tĕk'*: term applied to the works of art of the ancient Greeks and Romans especially their incomparable sculptures. The A. Style in works of art is distinguished by critics from the Romantic or Mediæval, and also from the Modern. The sculpture of the Greeks is characterized by freshness, originality, and ideality; and the phases that it underwent have their parallels in the development of the literature and general culture of that people. In the earliest times, the statues had a rigid, formal character, and looked more like the idols of barbarous nations than deities in human form; then came stern, Titan-like forms, corresponding with the Prometheus of Æschylus; next, the sculptures of Phidias, Polycletes, and Polygnotus—like the characters in the dramas of Sophocles—present to us humanity in its purest and noblest ideal forms. Then, as Euripides in poetry left the old domain of destiny, and derived motives and action from ordinary human passions, so statuary descended from the ideal, to a closer resemblance to the forms of actual life; as we see in the works of Praxiteles and Lysippus. Afterwards, when Aristophanes introduced comedy, forms of every-day life began to appear in sculpture; and thus a gradual transition was made from the art of the Greeks, which was ideal, in the true sense of the word, to that of the Romans, which was real, monumental, and portrait-like. The Romans were the realists of the ancient world; their indigenous philosophy was of a popular kind; their poetry, so far as it was national, was satire; and their works of art may be regarded as monuments and portraitures of real life.

ANTIQUITIES: see ARCHÆOLOGY.

ANTIQUITY, n. *ăn-tĕk'wĭ-tĭ* [F. *antiquité*; L. *antiq'uitas*; ancient time—from L. *anti'quus*, old] old times; former ages; times long since past. ANTIQUITIES, plu. *ăn-tĕk'wĭ-tĭz*, relics of olden times. ANTIQUARIAN, n. *ăn'tĭ-kwă'rĭ-ăn*, or ANTIQUARY, n. *ăn'tĭ-kwă'rĭ* [L. *anti-quārius*, studious of antiquity]: a person who studies the history of ancient things. ANTIQUA'RIAN, a. pertaining to antiquity. AN'TIQUA'RIANISM, n. ANTIQUATE, v. *ăn'tĭ-kwăt*, to put out of use; to make old. AN'TIQUA'TING, imp. AN'TIQUA'TED, pp.: ADJ. grown old; old-fashioned. AN'TIQUA'TEDLY, ad. *-lĭ*. AN'TIQUA'TEDNESS, n. ANTIQUE, a. *ăn-tĕk'* [F. *antique*]: old; ancient: N. a remnant of antiquity; a relic. ANTIQUE'LY, ad. *-lĭ*, in an antique manner.



**ANTIQUENESS**, n. *ăn-tēk'nēs*, ancientness; the appearance of being old.—**SYN.** of 'antique, a.': ancient; antiquated; obsolete; antic; old; aged.

**ANTI-RABIC TREATMENT**: see **RABIES**: **HYDROPHOBIA**: [**PASTEUR**].

**ANTI-RENTERS**: political party in N. Y. 1843-47: see **PATROON**: **VAN RENSSELAER**, **KILLIAN**.

**ANTIRRHINUM**, n. *ăn'ti-rī'nŭm*, **AN'TIRRHI'NUMS**, n. plu. [Gr. *anti*, like, similar; *rhin* or *rhina*, a snout]: a genus of plants, Ord. *Scroph'ularia'ceæ*, the flowers of most of the species bearing a perfect resemblance to the snout of some animals. See **SNAPDRAGON**.

**ANTISCIANS**, n. plu. *ăn-tīsh'ī-ănz*, or **ANTIS'CI**, *ăn-tīsh'ī-ī* [L. *antiscii*—from Gr. *anti*, opposite; *skīā*, a shadow]: the inhabitants of the earth living on opposite sides of the equator, whose shadows at noon fall in contrary directions.

**ANTISCORBUTIC**, a. *ăn'ti-skör-bŭ'tik* [Gr. *anti*, against, and *scorbutic*]: good against the scurvy: N. that which is good against scurvy. See **SCURVY**.

**ANTI-SEMITIC MOVEMENT**: recent movement in Europe involving socialistic tendencies, and opposing the Jews as alien by race and religion to the peoples among whom they dwell. In Germany, at its first congress (1895, June), the anti-Semites demanded the exclusion of all persons of Jewish connection from the professions, the army, the press, from all public schools, and from the privilege of acquiring property or carrying on business under German names; and that for the future all Jews should be forbidden to enter Germany from without. In Austria the anti-Semites (1895) elected their candidate mayor of Vienna, but the emperor refused to confirm the election. In Switzerland (1893) a law was passed forbidding the killing of animals according to the Talmud, by bleeding before the death-blow. In France, the party gained some power after the Panama canal scandals (1893), and the second trial of Capt. Dreyfus (1899) stirred up bitter sentiments.

**ANTISEPTIC**, *ăn'ti-sĕp'tik* [Gr. *anti*, against; *septos*, putrid]: a substance that prevents or arrests putrefaction and analogous fermentive changes: **ADJ.** opposing putrefaction. It has been proved that putrefaction (q.v.), fermentation of grape-juice (*vinous fermentation*), of milk (*lactic fermentation*), and many, though probably not all, other fermentations, depend upon the presence of microscopic vegetable organisms. See **GERM THEORY**. To prevent these processes, then, it is necessary either (1) to exclude these organisms altogether; or (2) to interfere with conditions which permit of their development; or (3) to destroy their vitality.

(1) These organisms, or their germs, are present in ordinary air; but it has been shown by Pasteur, Tyndall, Lister, Roberts, and others, that if air be filtered through cotton wool, or (if moving slowly) through a fine bent tube, it may be allowed to come in contact with putrescible substances, if these themselves contain no living organisms or germs,

## ANTISEPTIC.

without causing putrefaction. This method, however, has had no important practical applications.

(2) Their growth may be arrested (*a*) by a low temperature. Thus large quantities of fresh meat are exported from America, and even Australia and New Zealand, in chambers cooled to near the freezing-point. Carcasses of the long-extinct mammoth, with the flesh still present, have been found in the ice-cliffs of Siberia. The longer time that meat, milk, etc., keep in cold than in hot weather is familiar. (*b*) By absence of moisture. Thus, if the contents of an egg be thrown out on a plate, and thoroughly dried in an oven, the whole becomes of a hard, horny consistence, and may be kept in this state for years. If soaked in water, it will soon begin to putrefy. In the same way meat may be kept fresh by thoroughly drying it. The preservation of fruits, etc., in strong syrup is an example of a similar action.

(3) The vitality of these organisms may be destroyed (*a*) by heat; e.g., meat and other eatables can be preserved for an indefinite time if they are boiled and hermetically sealed when still hot in tin vessels (see PRESERVES); (*b*) by various chemical substances. Some of the most important are common salt and saltpetre, used in curing fish, pickling meat, etc.; alcohol, in preserving zoölogical specimens, vegetable essences, fruits, etc.; sulphurous acid, boracic acid, and arsenious acid; many salts, as chloride of zinc (Burnett's solution, q.v.), permanganate of potash (Condy's fluid, see under MANGANESE), sulphate of copper (blue vitriol), corrosive sublimate, nitrate of silver; chlorine (given off by chloride of lime), iodine, iodoform ( $\text{CHI}_3$ ), glycerine, boroglyceride ( $\text{C}_3\text{H}_5\text{Bo}_3$ ), eucalyptus oil, thymol, creosote, carbolic acid, salicylic acid, tannic acid, quinine, the patent preparation 'sanitas,' charcoal (both vegetable and animal), dry mold, used in the earth-closet system. See SEWAGE EARTH-CLOSET. All these substances act directly or indirectly as poisons to the organisms which produce putrefaction, etc.; most of them are either poisonous or very unpalatable to man, and cannot therefore be used in preserving food. Many of them are, however, used in the arts to arrest the decomposition of putrescible substances; e.g., in the manufacture of size for writing-paper from scraps of hides, sulphite of soda or antichlore, containing sulphurous acid, is added; hides are preserved by salt, or, when tanned, by tannin, a compound of tannic acid; timber is found less liable to decay if charged with an antiseptic, such as sulphate of copper, chloride of zinc, corrosive sublimate, or creosote. It is placed in a steam-box, so that the air contained in its pores is replaced by steam; the whole casing is then closed tight, and allowed to cool; the steam condenses and leaves a vacuum in and around the wood. If one of these substances is then introduced, it finds its way into the innermost pores of the timber. See WOOD-PRESERVING.

But next to the preservation of food, the most important purposes for which antiseptic methods and substances are used are the *prevention of infectious diseases*, and the *treatment of wounds*.

The properties of the infectious matter of infectious dis-



## ANTI-SLAVERY—ANTI-SLAVERY SOCIETY.

eases are closely analogous to those of the organisms that lead to putrefaction, etc.; and even in cases where its organic nature has not been proved (see GERM THEORY), can be rendered inert by a proper use of A., or by exposure to a high temperature. Thus anything that has come near the patient suffering from an infectious disease, also the discharges from his person, can be made harmless by carbolic acid, chloride of zinc, or some other antiseptic; his bedding is roasted in an oven at a temperature of 212° F. or more; the room where he has been treated is fumigated with chlorine or sulphurous acid, and so the disease is prevented from spreading. This is one of the chief aims of medical practice at the present day. See DISINFECTANTS.

Many of the evil effects which follow wounds and surgical operations are due to the presence of microscopic organisms (see PYÆMIA); and the effects of their antiseptic treatment, introduced by Mr. Lister, have been marvellous. See CARBOLIC ACID: ASEPSIS.

ANTI-SLAVERY, *n.* *ăn'ti-slă'vēr-ĭ* [Gr. *anti*, against, and *slavery*]: hostility to slavery. See ABOLITIONISTS.

ANTI-SLAVERY SOCIETY, THE AMERICAN: organized in Philadelphia 1833, Dec.; disbanded after the accomplishment of its mission 1870, Apr. 9. It was an outgrowth of the New England Anti-Slavery Soc., organized in Boston 1832, Jan. 6, by William Lloyd Garrison, Oliver Johnson, and others. The founders of the American Soc. were actuated by a belief that slavery was contrary to the principles of natural justice, our republican form of govt., and the Christian religion; that it was destructive of the prosperity of the country; that it endangered the peace, union, and liberties of the states; and that no scheme of expatriation could remove the evil. The declared object of the soc. was the entire abolition of slavery in the United States; and it pledged itself to strive to elevate the character and condition of the colored people, by encouraging their intellectual, moral, and religious improvement, and by removing public prejudice, that they might, according to their intellectual and moral worth, share an equality with the whites of civil and religious privileges. But it further and emphatically declared that it would never countenance the slaves in attempts to vindicate their rights by resorting to physical force. After its organization was completed, the soc. published a 'Declaration of Sentiments,' in which it further expressed the views of its founders on the question of slavery, and noted some of the measures determined on for the accomplishment of its object. The successive presidents of the soc. were Arthur Tappan, Lindley Coates, William Lloyd Garrison, and Wendell Phillips, and among its other officers and active promoters were Benjamin Lundy, Lucretia Mott, William Jay, John G. Whittier, Abby Kelly Foster, Gerrit Smith, Samuel J. May, Owen Lovejoy, and Edward Beecher. The soc. encountered hostility not only in political but in social and religious circles from its organization, and till the civil war began to establish unalterably the principles for which its members labored at the risk of their lives,

## ANTISPASMODIC—ANTITHESIS.

the soc. was constantly beset by danger, trouble, and malevolence. The Emancipation Proclamation and the ratification of the 13th, 14th, and 15th amendments to the federal constitution were the substantial fruits of a long and heroic struggle for the oppressed. See SLAVERY.

**ANTISPASMODIC**, a. *ăn-tĩ-spās-mōd'ík* [Gr. *anti*, against; *spasmos*, a convulsion or spasm]: applied to medicines that have power to allay spasmodic pains. See SPASM.

**ANTISTHENES**, *ăn-tĩs'thē-nēz*: founder of the Cynic school of philosophy; son of A., an Athenian. He fought in his youth at Tanagra (B.C. 426), survived the battle of Leuctra (B.C. 371), and d. at Athens at the age of 70. After listening to the teaching of Socrates, he gave up rhetoric, which he had followed at first as a disciple of Gorgias, and applied himself wholly to philosophy. He was present at the death of Socrates, and never forgave his persecutors. A. held that virtue mainly consists in voluntary abstinence from pleasure, and in a stern contempt of riches, honors, and even learning. Opinions of still greater extravagance are ascribed to A., but it is probable that they were extreme views, which he put into the mouths of the interlocutors in his dialogues, rather than expressions of his own views. Even in his condemnation of pleasure, he excepted such as springs from the soul, or is founded on true friendship. In consistency with his teaching, A. appeared as a beggar, clad in ragged garments—an eccentricity which Socrates is said to have reproved by saying, 'I see your pride through the holes in your cloak.' The singularity affected by A. gained many imitators, and among them Diogenes, who chose to live in a tub, and surpassed the master himself in Cynic practice. After the death of Socrates, A. taught moral and practical philosophy in the Athenian gymnasium Cynosarges, from which, it is said, his school derived its title. His writings—among them a polemical work against Plato—have mostly perished. Such fragments as remain have been collected by Winckelmann (A., *Fragmenta*, Zurich, 1842). Ritter classes A. with the 'imperfect Socraticists.'

**ANTISTROPHE**, n. *ăn-tĩs'trō-fē* [Gr. *anti*, opposite; *strophē*, a turning]: in *anc. poetry*, the stanza of a chorus or ode succeeding the strophe; in dancing around the altar, the *strophē* was sung while turning from the right to the left, and the *antistrophe* in turning from the left to the right—otherwise the former in turning from east to west, and the latter in turning from west to east. **AN'TISTROPH'IC**, a. *strōf'ík*, of or pertaining to.

**ANTITHESIS**, n. *ăn-tĩth'ē-sĩs*. **ANTITH'ESSES**, n. plu. *-ē-sēz* [Gr. *antithēsis*, placing in opposition—from *anti*, against; *thēsis*, a placing]: opposition or contrast in words or sentiments. **ANTITHETIC**, a. *ăn-tĩ-thēt'ík*, or **AN'TI-THET'ICAL**, a. *-ĩ-kāl*, being in contrast; containing opposition of words or sentiments. **AN'TITHET'ICALLY**, ad. *-lĩ*.

**ANTITHESIS**: figure of speech in which words are placed in direct opposition to each other to produce a strong



## ANTI-TOXIN—ANTIVARI.

contrast. Thus Lessing, in criticism on a book, says: 'It contains many good things, and many new; but the good are not new, and the new are not good.' A., naturally and moderately employed, gives liveliness to style; but becomes wearisome when too often repeated.

**ANTI-TOXIN.** *ăn-tĩ-toks'in*: new treatment for diphtheria by injection of serum from the blood of some animal, e.g. the horse, rendered immune to the disease by repeated injections of bacilli. Many favorable but occasional harmful results have attended its use. See KOCH, ROBERT: BACTERIA.

**ANTI-TRADES:** name given to upper tropical winds, because blowing in directions opposite to trade-winds.

**ANTITRINITARIAN:** one who denies the doctrine of the Trinity. An A. differs from a Unitarian only in this respect, that his objection to the doctrine in question is made on philosophical, while that of the latter is made on theological grounds. A Unitarian (at least according to the strict usage of former times—the theological limits of Unitarianism have now become more vague) is one who accepts the Bible as inspired, but does not find in it the doctrine of the Trinity; an A. is, or may be, a philosophical theist who denies the inspiration of Scripture. See UNITARIAN: SOCINIAN.

**ANTITROPAL**, a. *ăn-tĩt'rō-pāl*, or **ANTIT'ROPOUS**, a. *-pūs* [Gr. *anti*, against; *tropēō*, I turn]: in *bot.*, at the extremity most remote from the hilum, as the embryo—or inverted with respect to the seed, as the radicle.

**ANTITYPE**, a. *ăn'tĩ-tĩp* [Gr. *anti*, against; *typos*, a pattern]: the reality, of which the resemblance or pattern is called the *type*—thus, the paschal lamb is called the *type*, and Christ the *antitype*. See TYPE. **ANTITYPICAL**, a. *ăn'tĩ-tĩp'i-kāl*, that which explains the type. **AN'TITYP'ICALLY**, ad. *-lĩ*.

**ANTIUM**, *ăn'shĩ-ũm*: one of the most ancient cities of Latium; stood on the coast 34 m. s s.e. from Rome. Favorably situated for commerce and piracy, it became, under the Volscians, into whose hands it had fallen, one of the most powerful enemies of rising Rome, until finally subdued (B c. 338). It became a favorite resort of the wealthy Romans, and some of the most famous remains of ancient art have been discovered among the ruins of their villas and palaces; such as the Apollo Belvedere, and the Borghese Gladiator. It was the birthplace of the emperors Caligula and Nero; and the latter constructed a splendid port by means of two moles inclosing a basin two m. in circumference. A. was completely destroyed by the Saracens during the middle ages; and it was only in the 17th c. that the modern village of Porto D'Anzo arose, the population of which does not exceed 500.

**ANTIVARI.** *ăn-tē'vā-rē*: seaport 18 m. n.w. of Scutari, formerly of Albania, but on the coast-district assigned to Montenegro by the Treaty of Berlin in 1878; it has a good harbor, shut against war-ships. Pop. about 7,000.

## ANTLER—ANT-LION.

**ANTLER**, n. *ănt'lér* [F. *andouiller*]: a branch of a stag's horn; one of the complete horns. **ANTLERED**, a. *ănt'lérđ*, furnished with antlers.

**ANTLIA**, n. *ănt'li-ă* [L. *antliă*, a pump]: the spiral trunk with which butterflies and other lepidopterous insects suck up the juices of flowers. It 'is formed by the elongated slender maxillæ, still characterized by the minute palpi at their base. The inner margins of the maxillæ are concave, and the edges of the channels are in close contact, or are confluent, so as to form a canal along which the juices of the flowers can be pumped up into the mouth. The labial palpi are of large size, and defend the antlia when it is retracted and coiled 'up.'—*Owen*. In *astron.*, Antlia is an abbreviation for *A. Pneumatica* (the air-pump), one of the southern constellations introduced by Lacaille.

**ANTLIATA**, n. pl. *ănt-li-ă'ta* [L. L. furnished with a sucker, like a pump]: name given by Fabricius to the Dipterous order of insects, from their feeding by means of a sucker or pump (see **ANTLIA**); but the term *antlia* is now confined to the spiral sucker of the Lepidoptera, and the use of A. as a synonym for Diptera would be misleading.

**ANT-LION**: the larva of an insect (*Myrmelcon formicarium*) of the order Neuroptera, remarkable for its habits, which have been carefully observed by some foremost naturalists of Europe. It inhabits sandy districts, is not known in Britain, and is more common in the s. of Europe than in the north. The perfect insect is about an inch long and has a considerable general resemblance to a dragon-fly. The larva is rather more than half an inch long; it has a very large abdomen, and a small head, which, however, is



Ant-lion,

*a.* larva; *b.* perfect insect.

furnished with two very large incurved mandibles. It has six legs, but is incapable of rapid locomotion, and generally moves backwards. It feeds upon the juices of insects, particularly of ants, in order to obtain which it excavates with the greatest ingenuity a funnel-shaped hole in sandy ground, and lies in wait at the bottom, all but its mandibles buried in the sand. Insects which approach too near to the edge of the hole then become its prey, by the loose sand giving



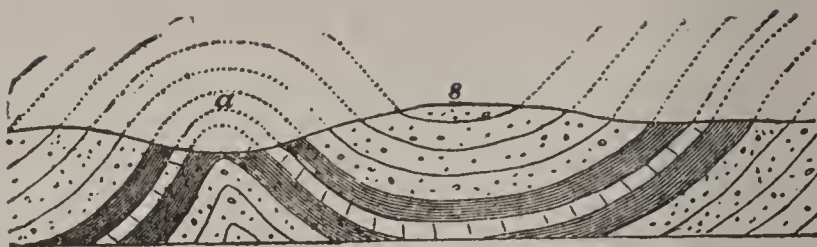
## ANTOMMARCHI—ANTONELLO.

way, so that they fall down the steep slope. If they do not fall quite to the bottom, but begin to scramble up again, the A. throws sand upon them by jerking its head, and so brings them back. It employs its head in the same way to eject their bodies from its pit, after their juices have been sucked, and casts them to a considerable distance; and by the same means throws away the sand in excavating its hole, first plowing it up with its body, and then placing it upon its head by means of one of its fore-legs. It always begins by working round the circular circumference of its future hole, and gradually narrows and deepens it; turning quite round after each time that it works round the hole, so as to employ next time the fore-leg of the other side. When it meets with a stone which it cannot remove, it deserts the excavation, and begins another. The pit is rather more than two inches deep. After about two years the larva spins its cocoon. Several species occur in the United States.

ANTOMMARCHI, *ân-tom-mar'kê*, FRANCESCO: b. Corsica, in the second half of the 18th c.; d. 1838, Apr. 3: a well-known physician, who left his situation in a hospital at Florence, to accept appointment as private physician to Napoleon Bonaparte when banished to St. Helena. The emperor grew attached to him, and bequeathed him 100,000 francs. In 1821, A. returned to Europe, and, 1826, published at Paris *Les Derniers Moments de Napoleon*. Afterwards he was accused of publishing as his own anatomical drawings, copies from plates by another physician. Suspicions, seemingly not ill-founded, were excited also as to the genuineness of a cast of Napoleon's head which he published in Paris. This cast purported to have been taken on Napoleon's death-bed, but was violently disputed by phrenologists. About 1836, he emigrated to America, and d. at San Antonio, Cuba.

ANTONELLI, *ân-to-nêl'ê*, GIACOMO, Cardinal. 1806, Apr. 2—1876; b. Somnino, a village near the Pontine Marshes. His father, a woodcutter, sent A. to be educated at the Grand Seminary of Rome, where he proved himself one of the cleverest students of his time. He gained the favor of Pope Gregory XVI., who named him a *prelato*, and gave him some excellent ecclesiastical appointments. In 1841, A. became under-sec. of state to the Ministry of the Interior; in 1844, second treasurer; and in the following year, finance minister of the two Apostolic Chambers. Pope Pius IX. having become pope, 1846, raised A., during the next year, to the dignity of cardinal deacon of St. Agatha alla Suburra. In 1848, A. was president and minister of foreign affairs in a liberal cabinet, which framed the famous *Statuto* or Constitution, proclaimed 1848, the principal articles of which were so very soon eluded. In the Ecumenical Council, which began its sittings in 1869, A. showed great tact and ability in restraining the zeal and impetuosity of his impulsive master. He died in 1876.

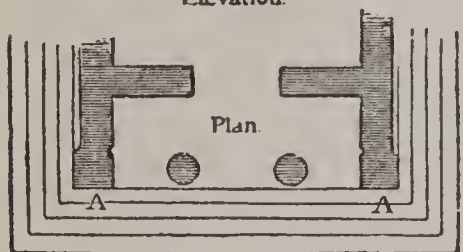
ANTONELLO, *ân-to-nêl'o* (of Messina): b. in Sicily, prob. abt. 1414; d. prob. 1493: a painter prominent in the history of Italian art. In his day, the paintings of Johann



*a*, Anticline; *s*, Syncline.

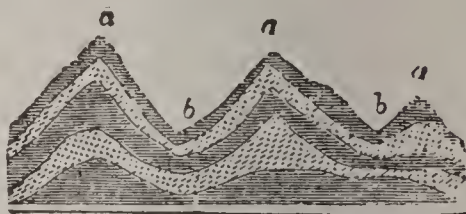


Elevation.



Plan.

Portico in Antis. A,A, Antæ.



*aaa*, Anticlinal Line; *bb*, Synclinal Line.



Antlers.—*a*. Brow-antler; *b*. Bez-antler; *c*, Antler-royal; *d*, Sur-royal or Crown antler.



Ant-lion, showing perfect insect, larva, and excavation.



## ANTONIANO—ANTONINUS.

van Eyck (of Flanders) had a wide celebrity, and several specimens were brought to Naples, where A. saw one of them. Admiring the new style of oil-painting, he travelled into Flanders, and learned the secrets of the art from Van Eyck. Afterwards, he settled in Venice, and was the first Italian who painted in oil colors, in which he gave instruction to many artists. His works are now rather scarce. One, in the Museum at Berlin, bears the date 1445.

ANTONIANO, *ân-to-ne-â'no*, SILVIO: 1540–1603; b. Rome: Italian improvisatore and cardinal. He won a wide reputation by his lectures as prof. of classical literature in the College of Sapienza, Rome. In 1598 he was made cardinal. He improvised verses in all the measures of Italian poetry, and wrote a *Treatise on Education*, and a volume of *Latin Orations*.

ANTONINUS, ITINERARY OF (*Antonini Itinerarium*): a valuable geographical work, containing the names of all the places and stations on the principal and cross roads of the Roman empire, with their distances from each other in Roman miles. It has been usually attributed to the emperor M. Aurelius Antoninus, whence its name. The testimony, however, of the Greek geographer Æthicus, author of the *Cosmographia*, assures us that a general survey of the Roman empire was commenced B.C. 44 in the consulship of Julius Cæsar and M. Antoninus, and completed in the reign of Augustus, when the results of the survey received the sanction of the state. These results, it is with some probability inferred, are embodied in this *Itinerary*, which, it is further supposed, received additions and amendments in the time of the Antonines. Subsequent improvements were made down to the reign of Diocletian. The best editions are those of Wesseling (Amst. 4to, 1735), and Parthey (Berl., 1848).

## ANTONINUS.

ANTONINUS, *ăn-tō-nī'nŭs*, MARCUS AURELIUS, Roman emperor: 121, Apr. 20—180, Mar. 17 (reigned 20 yrs.); b. Rome; son of Annius Verus and Domitia Calvilla. His original name was Marcus Annius Verus. On the death of his father, he was adopted by his grandfather, who spared no pains to render him pre-eminent in every art and science. His fine qualities early attracted the notice of the emperor Hadrian, who used to term him, not *Verus*, but *Verissimus*, and who conferred high honors on him, even while a child. When only seventeen years of age, he was adopted, with Lucius C. Commodus, by Antoninus Pius, the successor of Hadrian; and Faustina, the daughter of Pius, was selected for his wife. In the year 140 he was made consul; and from this period to the death of Pius, in 161, he discharged the duties of his various offices with the greatest promptitude and fidelity. The relation between him and the emperor was most warm and familiar. On his accession to the throne, he strikingly illustrated the magnanimity of his character, by voluntarily sharing the government (which Pius had left in his last moments, and the senate offered to him *alone*) with young Commodus, who henceforth bore the name of Lucius Aurelius Verus, and to whom he gave his daughter Lucilla in marriage. Towards the close of 161, the Parthian War broke out, and Lucius, a young man of vigorous bodily habits, was sent to the frontiers of the empire, to repel the incursions of the barbarians; but intoxicated with the enervating pleasures of the East, he obstinately refused to go beyond Antioch, and intrusted the command of the army to his lieutenant Cassius, who gained several brilliant victories. Lucius returned to Rome (166), and enjoyed a triumph to which he had no real claim; for all the great achievements of the war were accomplished by his officers, while he was revelling in the most extravagant licentiousness. In the mean time, Marcus Aurelius had distinguished himself by the prudence and energy with which he administered affairs at home. A formidable insurrection had long been preparing in the German provinces; the Britons were on the point of revolt, and the Catti waiting for an opportunity to devastate the Rhenish provinces. Within Rome itself raged a pestilence, believed to have been brought home by the troops of Lucius; frightful inundations and earthquakes had laid large portions of the city in ruins, destroyed the granaries in which were kept the supplies of corn, and thus created almost universal distress, which stimulated to an incalculable degree the terror which the citizens entertained of their savage enemies. To allay the popular perturbation, Marcus resolved to go forth to the war himself. Hecatombs were offered to the offended gods, and the Roman legions set out for the north. Marcus and Lucius were, for the time, completely successful. The pride of the Marcomanni, and the other rebellious tribes inhabiting the country between Illyria and the sources of the Danube, was humbled, and they were compelled to sue for peace in 168. In the year 169 Lucius died. The contest was renewed in 170, and may be said to have continued with little intermission during the whole life of the emperor. Although fond of peace, both from natural



disposition and philosophic culture, he displayed the sternest vigor in suppressing the revolts of the barbarians; but in order to accomplish this, he had to enrol among his soldiery vast numbers of gladiators and slaves, for his army had been thinned by the ravages of the plague. His headquarters were Pannonia, out of which he drove the Marcomanni, whom he subsequently nearly annihilated in crossing the Danube. The same fate befel the Jazyges; but the most famous as well as the most extraordinary of all his victories, was the miraculous one gained over the Quadi (174), which gave rise to copious discussion among Christian historians and others. Dion Cassius's account is, that the Romans were perishing of thirst in the heat of summer, when suddenly the cloudless sky darkened, and abundant showers fell, of which the soldiers were taking advantage when the barbarians attacked, and would have cut them to pieces, if a storm of hail and fire had not descended on the former. That some extraordinary phenomenon occurred is evident, for there is a letter of Aurelius still extant in which he commemorates the event; and the emperor was a man incapable of uttering a falsehood, not to mention that there was an entire army living to disprove the statement, if untrue. The effect of this remarkable victory was instantaneously and widely felt. The Germanic tribes hurried from all quarters to make their submission and obtain clemency; but the practical advantages that might have resulted from it were nullified by a new outbreak in the east, occasioned through the infamous treachery of his own wife, which demanded his presence, and though suffering from failing health, he was obliged to leave Pannonia. Before his departure, however, he learned that the ambitious governor, Avidius Cassius, who had rebelled against him and seized the whole of Asia Minor, had perished by assassination. The conduct of Marcus Aurelius on hearing of his enemy's death was worthy of the sublime virtue of his character. He lamented that the Fates had not granted him his fondest wish—to have freely pardoned the man who had so basely conspired against his happiness. Like Cæsar in similar circumstances, but in a more purely humane spirit, he received the head of his murdered adversary with quite opposite feelings to what had been anticipated, rejecting the bloody gift with all the loathing of a benevolent nature, and even shrinking from the presence of the murderers. On his arrival in the east, he exhibited the same illustrious magnanimity. He burned the papers of Cassius, without reading them, so that he might not be at liberty to suspect any as traitors; treated the provinces which had rebelled with extreme gentleness; disarmed the enmity and dispelled the fears of the nobles who had openly favored his insurgent lieutenant. While pursuing his work of restoring tranquillity, Faustina died in an obscure village at the foot of Mount Taurus; and her husband (and this was, perhaps, the single frailty of his character), though undoubtedly conscious of her glaring profligacy and infidelity, paid the most lavish honors to her memory.

On his way home, he visited Lower Egypt and Greece, displaying everywhere the noblest solicitude for the welfare

## ANTONINUS.

of his vast empire, and drawing forth from his subjects, who were astonished at his goodness, sentiments of the profoundest admiration and regard. At Athens, which this imperial pagan philosopher must have venerated as a pious Jew did the city of Jerusalem, he showed a catholicity of intellect worthy of his great heart, by founding chairs of philosophy for each of the four chief sects—Platonic, Stoic, Peripatetic, and Epicurean. No man ever labored more earnestly to make that heathen faith which he loved so well, and that heathen philosophy which he believed in so truly, a vital and dominant reality. Towards the close of the year 176, he reached Italy, and celebrated his merciful and bloodless triumph, Dec. 23. In the succeeding autumn he departed for Germany, where fresh disturbances had broken out among the restless and volatile barbarians. He was again successful in several sanguinary engagements; but his originally weak constitution, shattered by perpetual anxiety and fatigue, at length sunk, and he died either at Vienna, or at Sirmium, after a reign of 20 years.

Marcus Aurelius A. was the flower of the stoical philosophy. It seems almost inexplicable that so hard and crabbed a system should have produced as pure and gentle an example of humanity as the records of heathen—we had almost said, Christian—history can show. Perhaps, as a modern philosophic theologian suggests, it was because stoicism was the most solid and practical of the philosophic theories, and the one which most earnestly opposed itself to the rapidly-increasing licentiousness of the time, that the chaste heart of the youth was drawn towards it. At 12 years of age, he avowed himself a follower of Zeno, Epictetus, etc. Stoics were his teachers—Diognotus, Apollonius, and Junius Rusticus; and he himself is considered one of the most thoughtful teachers of the school. Oratory he studied under Herodes Atticus and Cornelius Fronto. His love of learning was insatiable. Even after he had attained to the highest dignity of the state, he did not disdain to attend the school of Sextus of Chæroneæ. Men of letters were his intimate friends, and received the highest honors both when alive and dead. His range of studies was extensive, embracing morals, metaphysics, mathematics, jurisprudence, music, poetry, and painting. Nor must we forget that these were cultivated not merely in the spring-time of his life, when enthusiasm was strong, and experience had not saddened his thoughts, and when study was his only labor, but during the tumults of perpetual war, and the distraction necessarily arising from the government of so vast an empire. The man who loved peace with his whole soul died without beholding it, and yet the everlasting presence of war never tempted him to sink into a mere warrior. He maintained uncorrupted to the end of his noble life his philosophic and philanthropic aspirations. After his decease, which was felt to be a national calamity, every Roman citizen, and many others in distant portions of the empire, procured an image or statue of him, which more than a hundred years after was still found among their household gods. He became almost an object



of worship, and was believed to appear in dreams, like the saints of subsequent Christian ages.

There is one feature in his character, however, which it would be dishonest to pass over—his hostility, namely, to Christianity. He was a persecutor of the new religion, and, it is clearly demonstrated, was cognizant, to a certain extent at least, of the atrocities perpetrated upon its followers. Numerous explanations have been offered of his conduct in this matter. The most popular one is, that he for once allowed himself to be led away by evil counselors; but a deeper reason is to be found in that very earnestness with which he clung to the old heathen faith of his ancestors. He believed it to be true, and to be the parent of those philosophies which had sprung up out of the same soil; he saw that a new religion, the character of which had been assiduously, though perhaps unconsciously, misrepresented to him, both as an immoral superstition, and a mysterious political conspiracy, was secretly spreading throughout the empire, and that it would hold no commerce with the older religion, but condemned it, generally in the strongest terms. It was, therefore, comparatively easy, even for so humane a ruler, to imagine it his duty to extirpate this unnaturally hostile sect. Mr. John Stuart Mill finds in this tragical error of the great emperor a most striking warning against the danger of interfering with the liberty of thought. What he says is so completely in harmony with the above conception of the motives of Marcus Aurelius, and is in itself so eloquent, that no apology is required in quoting the passage: “If ever any one possessed of power had grounds for thinking himself the best and most enlightened among his contemporaries, it was the emperor Marcus Aurelius. Absolute monarch of the whole world, he preserved through life not only the most unblemished justice, but what was less to be expected from his stoical breeding, the tenderest heart. The few failings which are attributed to him were all on the side of indulgence; while his writings, the highest ethical product of the ancient mind, differ scarcely perceptibly, if they differ at all, from the most characteristic teachings of Christ. This man, a better Christian, in all but the dogmatic sense of the word, than almost any of the ostensibly Christian sovereigns who have since reigned, persecuted Christianity. Placed at the summit of all the previous attainments of humanity, with an open, unfettered intellect, and a character which led him, of himself, to embody in his moral writings the Christian ideal, he yet failed to see that Christianity was to be a good and not an evil to the world, with his duties to which he was so deeply penetrated. Existing society he knew to be in a deplorable state. But such as it was, he saw, or thought he saw, that it was held together, and prevented from being worse, by belief and reverence of the received divinities. As a ruler of mankind, he deemed it his duty not to suffer society to fall in pieces, and saw not how, if its existing ties were removed, any others could be formed which could again knit it together. The new religion aimed openly at dissolving these ties: unless, therefore, it was his duty to adopt that re-

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ligion, it seemed to be his duty to put it down. Inasmuch, then, as the theology of Christianity did not appear to him true, or of Divine origin; inasmuch as this strange history of a crucified God was not credible to him, and a system which purported to rest entirely upon a foundation to him so wholly unbelievable, could not be foreseen by him to be that renovating agency which, after all abatements, it has in fact proved to be; the gentlest and most amiable of philosophers and rulers, under a solemn sense of duty, authorized the persecution of Christianity. To my mind, this is one of the most tragical facts in all history. It is a bitter thought, how different a thing the Christianity of the world might have been if the Christian faith had been adopted as the religion of the empire, under the auspices of Marcus Aurelius, instead of those of Constantine. But it would be equally unjust to him, and false to truth, to deny, that no one plea which can be urged for punishing anti-Christian teaching, was wanting to Marcus Aurelius for punishing, as he did, the propagation of Christianity. No Christian more firmly believes that atheism is false, and tends to the dissolution of society, than Marcus Aurelius believed the same things of Christianity; he who, of all men then living, might have been thought the most capable of appreciating it. Unless any one who approves of punishment for the promulgation of opinions flatters himself that he is a wiser and better man than Marcus Aurelius—more deeply versed in the wisdom of his time—more elevated in his intellect above it—more earnest in his search for truth—let him abstain from that assumption of the joint infallibility of himself and the multitude, which the great A. made with so unfortunate a result.—See Renan's *Marc Aurèle* (1882).

ANTONINUS, WALL OF (*Antonini Vallum*): a barrier erected between the Firths of Forth and Clyde by the Romans, in the reign of Antoninus Pius, to restrain the encroachment of the native tribes. A fragment of a Roman pillar, formerly in the Univ. of Edinburgh, fixes its date at 140. The superintendence of the work is generally attributed to the imperial legate Lollius Urbicus. Its length was about 27 English m.; the e. termination being, according to two different suppositions, at Carriden, or at Kinniel, on the Forth; the w. at Old Kilpatrick, or at Dunglass Castle, on the Clyde. The work consisted of a ditch about 20 ft. deep and 40 wide, a rampart of earth and stone about 20 ft. high and 24 ft. thick at the base, and on the inner or s. side of the rampart a paved military road. It was protected by a chain of nineteen forts, with watch-towers between. The line of the wall may still be traced to a considerable extent. The most perfect fragments are at Elf Hill, on the moor of Bonnieside, about a mile and a half from Castlecary; within the park of Callander House, near Falkirk; and on the slopes at Inveravon, not far from the railway station at Polmont. It is commonly designated *Graham's Dike*—a name given to more than one ancient ditch and rampart in England. See SEVERUS, WALL OF. For best accounts of the Wall of Antonine, see Roy's *Mili-*



## ANTONINUS PIUS.

*tary Antiquities of the Romans in North Britain* (1793), and Stuart's *Caledonia Romana* (2d ed., 1852).

ANTONINUS PIUS, *ăn-tō-nī'nus pī'us*, TITUS AURELIUS FULVUS, Roman emperor: 86-161 (reigned 138-161) b. in the reign of Domitian. The family of A. was originally from Nemausus, now Nîmes, in Gaul. A. inherited great wealth, and early showed excellent qualities. In 120, he was made consul; afterwards was sent by Hadrian as proconsul into Asia, where the wisdom and gentleness of his rule won for him a higher reputation than had been gained by any of his predecessors. By his wife Faustina he had four children, of whom three died, leaving a daughter, Faustina, afterwards wife of Marcus Aurelius. In 138, he was adopted by the emperor Hadrian, in consequence of merit alone, and came to the throne in the same year. The reign of A. was proverbially peaceful and happy. In his private character he was simple, temperate, and benevolent; while in public affairs he acted as the father of his people. The persecution of Christians, which was continued during his reign, was partly stayed by his mild measures. He was little engaged in war, excepting in Britain, where he extended the power of Rome, and built a wall between the Forth and the Clyde, as a defense against invasions by the predatory inhabitants of the north; but he was frequently employed in arbitration and general counsel on the affairs of foreign states. 'Happy the nation which has no history.' The reign of A. illustrates this saying, for by the justice, wisdom, kindness, and courtesy of the emperor, his vast empire was preserved from the crimes, conspiracies, insurrections, and bloodshed, the recording of which formed the largest part of the historian's work in the dark centuries of the Roman empire. It is said that only *one* senator was



Copper Coin of Antoninus Pius, commemorative of his victories in Britain. From one in the British Museum.

impeached during A.'s lifetime. Literature received great encouragement; the laws were improved; commerce extended, the means of communication were facilitated by the repair of roads, bridges, etc.; new sanitary regulations were introduced, and a taste for architecture fostered in the citizens. The epithet *Pius* was conferred on him on account of his conduct in defending the memory of his predecessor Hadrian against certain dishonoring measures brought for-

ward by the senate. The column raised to A.'s memory by his adopted son and successor, Marcus Aurelius Antoninus (q.v.), was discovered in 1709, and now exists only in fragments. The so-called Pillar of Antoninus, now in the *Piazza Colonna* at Rome, is that raised by the senate in honor of Marcus Aurelius, after his victory over the Marcomanni.

ANTONIUS, *ăn-tō'nĭ-ŭs*, MARCUS (MARK ANTONY), the Roman triumvir: B.C. 83-30; descendant of one of the oldest patrician families; son of the prætor M. Antonius Creticus, and on the side of his mother Julia, related to Julius Cæsar. His youth was wasted in dissipation, and finding himself pressed by numerous impatient creditors, he escaped to Greece in B.C. 58, where for a short time, he listened to the teaching of Athenian philosophers and orators. His studies here were soon interrupted by the proconsul Gabinius, who appointed him leader of his cavalry. In the campaign against Aristobulus in Palestine, and in Egypt, A. distinguished himself by his courage and activity, and ingratiated himself with the soldiers. After assisting Cæsar in Gaul, he went to Rome in 50, to advance the interests of the former, who stood in great danger from the hostility of the oligarchical party, and was appointed an augur, and chosen one of the tribunes of the people. In the following year, on account of his adherence to the party of Cæsar, he was expelled from the curia, and fled to Cæsar, who made use of this event as a pretext for his war against Pompey. At the outbreak of this war, A. received the appointment of commander-in chief in Italy. In the battle of Pharsalia, he commanded the left wing of Cæsar's army. In 47, he was made master of the horse by Cæsar, who left him to govern Italy during his absence in Africa. Antony, as usual, disgraced himself; was perpetually drunk; divorced his wife, and married an actress, with whom he paraded offensively through the chief towns of the peninsula. In 44, he married Fulvia, the widow of Clodius; was made consul, and vainly endeavored to prevail on the Romans to recognize Cæsar as emperor. After the assassination of Cæsar, he played the part so well described by Shakespeare; and by his funeral oration, and the well-timed display of Cæsar's bloody robe, so wrought on the passions of the people, that the conspirators were compelled to escape from Rome, leaving the successful orator for a while in possession of almost absolute power. A. was then occupied in disputes and reconciliations with Octavianus (Cæsar's heir), besieging Mutina, and then denounced by Cicero as an enemy of the state. In 43, his troops were defeated at the battle of Mutina, when he escaped beyond the Alps; visited the camp of Lepidus, who commanded in Gaul; and gained the favor of the army, of which he took the command. Plancus and Pollio joined him with their troops; and A., who so recently had escaped as a helpless fugitive from Italy, returned to Rome at the head of seventeen legions and 10,000 cavalry. Octavianus, who had pretended to maintain republican principles, now threw off the mask, and held a consultation with A. and Lepidus on the island of Renc



(or Lavino), near Bologna, when it was determined that these triumviri should share the whole Roman world among themselves. To secure their spoil, they returned to Rome, and began their course of murder and robbery throughout Italy. Among their first victims fell Cicero, the orator whose eloquence they dreaded. According to Appian, not less than 300 senators and 2,000 knights fell under the power of the triumviri. After making Italy safe for themselves, and raising an enormous sum of money to carry on their war abroad, A. and Octavianus led their troops into Macedonia against Brutus and Cassius, and defeated the republican forces. A. next visited Athens, and then went into Asia, to arrange his dispute with Cleopatra, queen of Egypt, whose conduct had offended the triumviri. The queen herself appeared to answer his challenge, and captivated A. by her beauty and address. The general who had overcome Brutus and Cassius was now made a prisoner, though not of war. He followed Cleopatra into Egypt, and lived with her in idleness and luxury, until he was aroused by tidings of the quarrel which had taken place in Italy between his own relatives and Octavianus. This dispute gave rise to a short war, which came to an end before A. arrived in Italy. A new division of the Roman world now took place between the triumviri, and was soon quietly arranged at Brundisium. A. took the east, and Octavianus took the west; while the ambition of the feeble Lepidus was appeased by his having the whole of Africa for his portion. Even this shadow of dominion was taken from him in 36. Meanwhile A. had confirmed his friendship with Octavianus by a marriage with Octavia, his sister. He now returned to Cleopatra, resumed his former voluptuous mode of life, squandered the wealth of Rome in gifts to his royal mistress, and became guilty of gross injustice. Octavianus made use of these facts to excite the indignation of the Roman people against A., and a war between the rivals became unavoidable. A., in his idleness, tried to postpone the trial of strength which he saw inevitably approaching, and filled the island of Samos (where his troops were quartered) with musicians, jugglers, and buffoons. Meanwhile, at Rome, he was deposed from the triumvirate, and war was proclaimed against Cleopatra. Each party collected its forces, and in the naval engagement which took place (31), near Actium (q.v.) A. was defeated. His subsequent hope of finding troops still faithful to him in Libya was disappointed. He returned to Egypt, where, with Cleopatra, he once more forgot political cares and vexations, until his amusements were suddenly interrupted by the arrival of Octavianus at Alexandria. A. now roused himself, made a charge with his cavalry, and repelled his enemy; but the advantage was only momentary. Deserted by the Egyptian fleet, as by his own army, and suspecting that even Cleopatra had conspired against him, he went to her palace, from which the queen had escaped. Deceived by a false message informing him of the death of Cleopatra, A. committed suicide by falling upon his sword.

ANTONIUS, or ANTONY OF PADUA, SAINT; 1195, Aug

## ANTONOMASIA—ANTONY.

15—1231, June 13; b. Lisbon: on his father's side, related to Godfrey of Bouillon. He was first a monk of the Augustine order, but in 1220 he entered the Franciscan order, and soon became one of its most active propagators. On his missionary voyage to Africa, being cast on the coast of Italy, he preached with great success at Montpellier, Toulouse, Bologna, and Padua, where he died. The legends of A. abound in marvels, such as that his eloquence as preacher was so great, that even the fish in the sea were deeply affected by it! His anniversary is June 13. His monument, a fine work of statuary, is in the church which bears his name at Padua.

ANTONOMASIA, *ăn'tō-nō-mā'zǎ-ă*: a rhetorical figure in which an epithet is substituted for a proper name; e.g. 'the Stagyrte' for Aristotle. Or the process may be reversed; e.g. when a very rich man is called 'a Cræsus.' This figure has a resemblance to metonymy.

ANTON ULRICH, *ăn'ton ool'rik*: 1714–80 (supposed): second son of Duke Ferdinand Albert of Braunschweig-Wolfenbüttel (till 1735, Braunschweig-Bevern, the title by which the prince was first known in Russia. When the Russian empress Anna was looking out for an alliance for her niece, Anna Carlovna, princess of Mecklenburg-Schwerin, the influence of Austria led her to choose A. U. Accordingly, he came to Russia in 1733, was appointed colonel of a cuirassier regt., and placed in the receipt of a considerable pension. The marriage was, however, long delayed. The princess showed a decided distaste for the insignificant character of the bridegroom-elect, and married him only to avoid a still more hated union with the son of Biron. The birth of the prince Ivan took place in 1740, a year after the marriage. About the same time, the empress falling dangerously sick, appointed the infant prince her successor, and Biron regent. After her death, A. U. made some feeble attempts to reverse this appointment, which only led to the punishment of those supposed to have instigated them, and to his own military degradation. Biron's conduct towards the parents of the infant prince becoming unbearably insolent, Anna appealed in despair to Gen. Münnich, who put a sudden end to Biron's sway, and declared the grand-duchess and her husband regents. After a few months, Anna ungratefully overthrew Münnich. After his fall, as little unity prevailed between the ministers at the helm as between herself and her husband, and the government was looked upon as both foreign and contemptible. Then came the revolution of 1741. Dec. 5, which in one night raised Elizabeth (q.v.) to the throne. A. U. and his consort were exiled, and lived long at Cholmogory, in the government of Archangel. Three children were born to them in exile. Anna died in 1746. Catharine II. offered A. U. his freedom, but he declined it. Ultimately, he grew blind. The exact year of his death is uncertain. Catharine offered his children an asylum in Jutland.

ANTONY, *ăn'to-nǐ*, SAINT, surnamed THE GREAT (also ANTONY OF THEBES), the father of monachism:



## ANTONY.

abt. 251–356, Jan. 17; b. Koma, near Heraklea, Upper Egypt. His parents were wealthy and pious. Having, in obedience to what he believed to be a divine injunction, sold his possessions, and distributed the proceeds among the poor, he withdrew into the wilderness, where he disciplined himself in all those austerities which have hallowed his memory in the Rom. Cath. Church, and formed the model of the monastic life. When 30 years of age, however, desirous of obtaining a deeper repose than his situation afforded, he penetrated further into the desert, and took up his abode in an old ruin on the top of a hill, where he spent 20 years in the most rigorous seclusion; but, in 305, he was persuaded to leave this retreat by the prayers of numerous anchorites, who wished to live under his direction. He then founded the monastery of Faïoum, at first only a group of separate and scattered cells near Memphis and Arsinoë; which may be considered the origin of cenobite life. The persecution of the Christians by Maximian in 311, induced St. A. to leave his cell and go to Alexandria, in the hope of obtaining the crown of martyrdom, but having failed in this, he returned to his solitude in the course of a year, which, however, he soon left, plunging yet deeper into the desert. At length he found a lodgment on a hill, about a day's journey from the Red Sea; but his disciples discovering his retreat, so pressed him with their affectionate importunities, that he ventured to accompany them back. After many pious exhortations, he once more left them, and soon became the mighty oracle of the whole valley of the Nile. In 355, the venerable hermit, then 104 years of age, made a journey to Alexandria to dispute with the Arians. He had interviews with Athanasius and other distinguished persons; but feeling his end approaching, he retired to his desert home, where he died.

Athanasius states, in his *Life of St. A.*, that the saint wore only a coarse shirt of hair, and never washed his body, which is more credible than the stories that he relates of his encounters with the devil, or his miracles. His whole conduct indicates the predominance of a glowing and yet gloomy fancy—the proper condition of religious asceticism. Although the father of monachism, St. A. is not the author of any monastic ‘rules’; those which the monks of the eastern schismatic sects attribute to him are the production of St. Basil. He is perhaps the most popular saint in the Rom. Cath. Church. Accounts of his life and miracles are given in the *Acta Sanctorum* of the Bollandists, under date Jan. 17, on which day his festival was kept.

ST. ANTHONY'S FIRE.—The Rev. Alban Butler, in his *Lives of the Saints*, gives the following account of the origin of this name: ‘In 1089, a pestilential erysipelatous distemper, called the *sacred fire*, swept off great numbers in most provinces of France; public prayers and processions were ordered against this scourge. At length, it pleased God to grant many miraculous cures of this dreadful distemper, to those who implored His mercy through the intercession of St. A., especially before his relics; the church [of La Motte St. Didier, near Vienne, in Dauphiné] in which they were deposited was resorted to by great numbers of pilgrims,

## ANTRAIGUES—ÂNTRIM.

and his patronage was implored over the whole kingdom against this disease.' The 'Order of Canons Regular of St. Anthony,' a religious fraternity, founded about 1090, for the relief of persons afflicted with the fire of St. A., survived in France till 1790.

ST. ANTHONY'S WELL, a small fountain near the ruined chapel of St. A., on the n. slope of Arthur's Seat (q.v.), near Edinburgh. This interesting fountain, which consists only of a stone basin, into which water trickles from under an incumbent rock, is celebrated in the Scottish song, '*O, waly, waly.*'

ANTRAIGUES, *ôn-träg'*, EMANUEL-LOUIS-HENRI DE-LAUNAY, Comte D': 1755-1812; b. Vivarais, dept. Ardèche: a great politician, but very ambiguous character. He was educated under the Abbé Maury. His superior talents were shown first in his *Mémoire sur les Etats-généraux, leurs Droits et la Manière de les convoquer* (1788). This book, full of daring assertions of liberty, was one of the first sparks of the fire which afterwards flamed in the French Revolution. In 1789, when A. was chosen as a deputy, he not only defended the privileges of the hereditary aristocracy, but also ranked himself with those who opposed the union of the three estates; while in the discussions on the constitution, he maintained that the royal *veto* was an indispensable part of good government. After leaving the assembly in 1790, he was employed in diplomacy at St. Petersburg and Vienna, where he defended the cause of the Bourbons. In 1803, he was employed under Alexander of Russia in an embassy to Dresden, where he wrote against Bonaparte a brochure entitled *A Fragment of the 18th Book of Polybius, discovered on Mount Athos*. He afterwards went to England, and acquired great influence with Canning. Despite his attachment to the interest of the Bourbons, he could never win the confidence of Louis XVIII. In 1812, he was murdered, with his wife, at his residence near London, by an Italian servant, who, immediately afterwards, committed suicide.

ANTRE, n. *ăn'tér* [L. *antrum*, a cave]: in poetry, a cavern; a den.

ÂNTRIM, *ăn'trīm*: maritime county in the n.e. of Ireland, province of Ulster; bounded, n. by the Atlantic; w. by the n. part of the river Bann, dividing it from Londonderry, and by Lough Neagh; s. by Lagan river, separating it from the county of Down; s.e. by Belfast Lough; and e. by the Irish Channel. It stands third among the Irish counties in population, but in extent only ninth. Its greatest length is 56 m.; its greatest breadth, 30; its extent of sea-coast, 90 m.: 1164 sq. miles. About two-thirds of this is arable; a fourth barren; and a seventy-fourth in woods. Off the n. coast lie Rathlin Isle and the Skerries; and off the e. coast, the Maiden Rocks; the e. coast is hilly; and from Larne to Fair Head, parallel mountain-ranges of no great height, and covering a third of the county, stretch s.w. into the interior, forming valleys opening seaward, called the Glens of Antrim. The interior slopes towards Lough Neagh. The highest eminences are—Trostan, 1,810 feet, and Slievemish, or Slemish, 1,782 feet. The principal streams are—the Bann,



## ANTRORSE—ANTWERP.

from Lough Neagh to the Atlantic; the Main, running parallel to the Bann, but in the reverse direction, into Lough Neagh; and the Bush, flowing n. into the Atlantic. Peat-bogs are numerous. Six-sevenths of the surface consist of basaltic trap, often alternating with red ochre, and overlying hardened chalk, green-sand, new red sandstone, and mica-slate. The surface and edges of the trap-field, in some places, present basaltic columns of varied outlines. The green-sand and new red sandstone crop out on the e. and s.e. borders, and millstone grit occurs in the n.e. Between Ballycastle and the mouth of the Bann, the basalt assumes very picturesque forms; and the Giants' Causeway is one of the most perfect examples of columnar basalt in the world. Fine salt mines occur at Duncrue and Carrickfergus; and small coal-fields near Ballycastle, and in the interior. Rich beds of iron ore of fine quality have been recently opened in Glenravel, and a large export has been carried on from Cushendall and Carnlough. The soil of A. is mostly light, and the chief crop is oats. In 1882, 243,831 acres were under crop, 77,847 being in oats, 44,974 in potatoes, and 4,504 in wheat. The land is very much subdivided; and the rearing of flax, and the various branches of the linen, cotton, and coarse woolen manufacture, employ a great portion of the people. In 1881, there were upwards of 95,000 pupils on the rolls of the national schools in the county (23,000 being Rom. Catholics). The principal towns are Belfast, Lisburn, Ballymena, Ballymoney, Carrickfergus, Larne, and Antrim. Before 1885, County A. returned two members to parliament; Belfast borough, two; and Carrickfergus and Lisburn boroughs, each one; but since 1885 it returns eight members, of whom four represent the city of Belfast. Nearly one-half of the inhabitants are Presbyterians, the county having been extensively colonized from England and Scotland. The original possessors were the O'Neills, who, partially dispossessed by John de Courcy, reappeared on the failure of his line, regained nearly the whole of the country, and kept it till the forfeiture of Shane O'Neill. Pop. (1851) 352,264; (1851) 368,948; (1871) 404,015; (1881) 421,943, of whom nearly 190,000 were Presb., 108,000 Rom. Cath., and 98,000 Prot. Episcopalians; (1901) 545,270.

**ANTRORSE**, a. *än-trörs'* [L. *ante*, before; *versus*, turned]: in *bot.*, having an upward direction towards the summit of some part.

**ANTWERP**, *änt'wèrp* (in French, **ANVERS**, *ön-vair'*): cap. of the prov. which bears its name, and the chief commercial city of Belgium; on the river Scheldt. Its chief public institutions are the Acad. of Sciences, Acad. of Painting and Sculpture, formerly known as the Acad. of St. Mark, a Medical and Surgical School, Naval Arsenal, Museum, and Zoological Gardens. The cathedral, one of the noblest Gothic structures in Europe, is 500 ft. in length by 240 in breadth, with a roof supported by 125 pillars, and a very lofty spire. The interior is enriched by the two greatest of all the pictures of Rubens, *The Elevation of the Cross*, and *The Descent from the Cross*. The Church of St. James contains the monument of the Rubens family. The

## ANUBIS.

new fortifications, recently erected, render this commercial capital of Belgium one of the most strongly fortified places in Europe. The trade and manufactures of A. have recently greatly extended, and the large dock and quay accommodation having been found too limited, steps have been taken for making a new quarter of the town, with ample harbor-room, on the opposite side of the Scheldt. The manufactures consist chiefly of sugar, white-lead, cotton goods, point-lace, linen thread, carpets, gold and silver lace. It is celebrated for its sewing-silk, black silk stuffs, and printer's ink, as it was in former times for its velvets, damasks, and satins. There are also to be mentioned tobacco manufacture, the cutting of diamonds and other precious stones, and shipbuilding.

A. is mentioned as early as the 8th c.; in the 12th and 13th it gave signs of considerable prosperity, and in 1550 numbered more than 200,000 inhabitants. The union of Belgium with Holland in 1815 was very favorable to the commerce and general prosperity of A. By the revolution, 1830, Aug., it was linked to the destiny of Belgium. When the revolutionary party gained possession, the commandant, Gen. Chassé, retreated to the citadel, and, exasperated by the breach of truce, commenced a bombardment, which destroyed the arsenal and about thirty houses. In 1832, a French army of 50,000 men, under Marshal Gérard, appeared before A., to demand the surrender of the citadel, which Gen. Chassé refused. After the interior of the citadel had been reduced to ruins by the French artillery, Gen. Chassé capitulated; the Flemish fortification, and the forts Burght, Zwindrecht, and Austroeweel were surrendered to the Belgian troops, and the Dutch troops were taken to France, as hostages for the surrender of the forts Lillo and Liefkenshoek, according to an article in the negotiation of 1831, Nov. 15, which stipulated that the five citadels held by the Dutch troops in Belgium should be surrendered. Pop. (1901) 278,093.

ANUBIS, n. *ă-nū'bīs*: an Egyptian deity, styled Anepu on hieroglyphic monuments; according to mythology, the son of Osiris and Nephthys. By the Greeks, he was frequently styled Hermes or Hermanubis, combining the Egyptian with the Grecian name. He is represented on monuments as having the head of a jackal, with pointed ears and snout, which the Greeks frequently changed to those of a dog. Sometimes he is seen wearing a double crown. A white and yellow cock was sacrificed to him. His office, like that of Hermes Psychopompus among the Greeks, was to accompany the ghosts of the deceased into Hades (Amenthes), and there to assist Horus in weighing their actions, under the inspection of Osiris. As, in the time of the Romans, the Egyptian worship had spread beyond Egypt itself, the two conceptions of A. and Hermes were blent together, and the dog's head of the former was found united to the insignia of the latter.



Anubis.



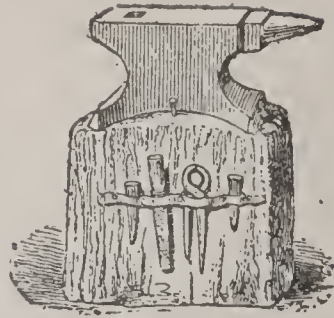
**ANUPSHUHUR**, *an-ŭp-shuh-hèr'*: town of India, in the British dist. of Bolundshuhur, Northwest Provinces, on the right bank of the Ganges, 73 m. e. from Delhi, on the route to Bareilly. The channel of the Ganges is here about a mile wide, but only about one-fifth of that space is occupied by the stream in the dry season. The town is ill built and crowded, the houses either of mud or ill-cemented brick. Pop. about 12,000.

**ANUS**, n. *ā'nūs* [L.]: term applied by anatomists to the lower or (in the case of animals) the posterior aperture of the intestinal canal; the rectum terminating externally in the anus. With regard to its anatomy, it is sufficient to state that it is kept firmly closed on ordinary occasions by the *external* and *internal sphincter* muscles, the former of which contracts the integument around the opening, and, by its attachment to the coccyx behind, and to a tendinous centre in front, helps the *levator ani* muscle in supporting the aperture during the expulsive efforts that are made in the passage of the fæces or intestinal evacuations; while the latter, or *internal sphincter*, is an aggregation of the circular muscular fibres of the lowest part of the rectum, and acts in contracting the extremity of the tube. The main function of the *levator ani* muscle is expressed in its name it being the antagonist of the diaphragm and other muscles which act in the expulsion of the fæces. The integument around the anus lies in radiating plaits, which allow of its stretching without pain during the passage of the fæces; and the margin is provided with a number of sebaceous glands, which, in some of the lower animals, secrete strongly odorous matters. See **ANAL GLANDS**. Infants are occasionally born with an imperforate *anus*, or congenital closure of the rectum. In the simplest form of this affection, the anus is merely closed by thin skin, which soon becomes distended with the Meconium (q.v.). More complicated cases are those (1) in which the gut terminates some distance above the seat of the anus in a blind sac or pouch; (2) where the rectum terminates in the bladder, etc. Fortunately, the closure by a layer of skin is far the most common form of imperforate anus, and the little patient is at once relieved by a very simple surgical operation. If, however, no treatment be adopted, too often the case in consequence of a popular delusion that the affection is incurable, the abdomen becomes distended and hard, vomiting comes on, the vomited matters soon assume a fæcal smell, and the infant dies in a few days, either from exhaustion or rupture of the intestines.

*Spasm of the Sphincter Ani* is by no means a rare affection; it is characterized by violent pain of the anus, with difficulty in passing the fæces. On attempting an examination, the muscle feels hard, and resists the introduction of the finger. It usually occurs in sudden paroxysms, which soon go off: but sometimes it is of a more persistent character. Its causes are not clearly known, and although most surgeons regard it as a special affection, some consider that the spasm is not a disease in itself, but merely a symptom of some slight excoriation or ulceration. Suppositories containing opium or belladonna, introduced during the period of relaxa

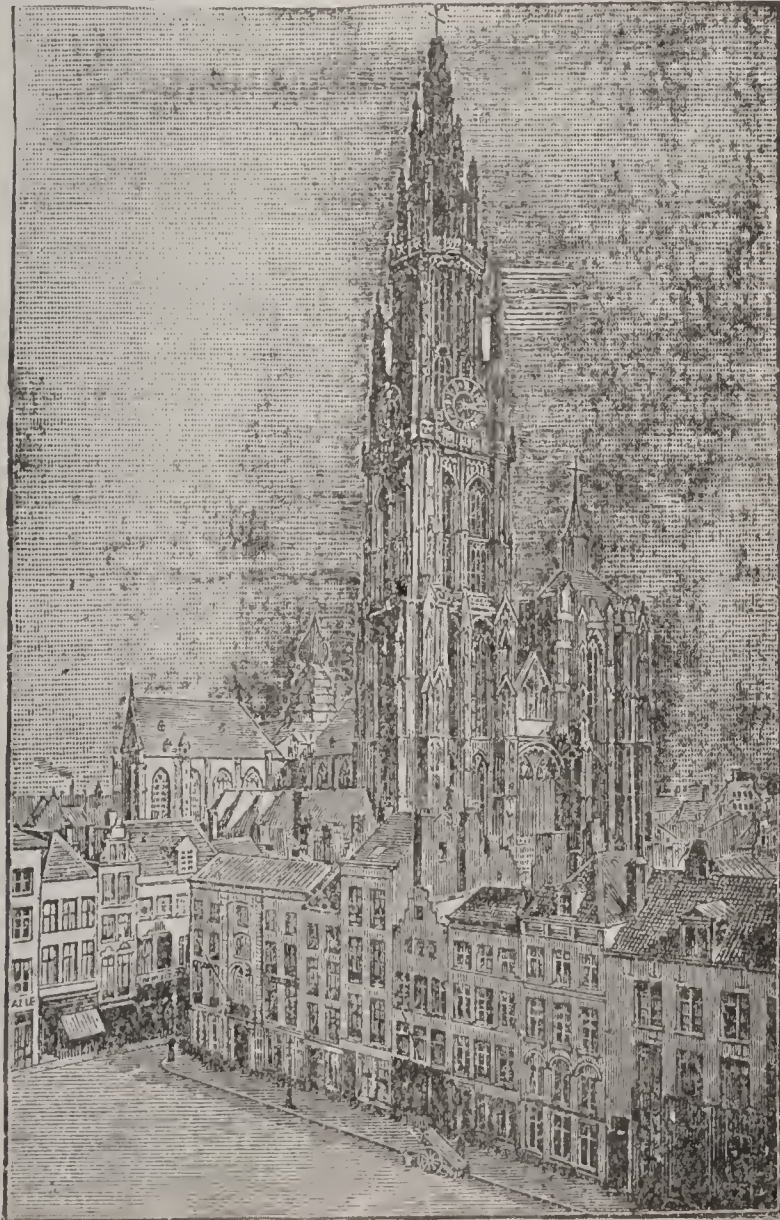
tion, are sometimes of use; and if there are ulcers, they must be specially treated. *Ulceration* occurring as a breach of surface at one or more points around the anus, but not extending within the orifice, is by no means uncommon in persons who are not attentive to cleanliness, and especially in women with vaginal discharges. Strict attention to cleanliness, the patient being directed to apply warm water to the parts at least twice daily with a sponge (which after each operation should be carefully rinsed out), and one or two applications of the solid nitrate of silver, followed by black-wash, will effect a speedy cure. If the ulcer is seated partly *without* the anus and partly *within* the rectum, the distress is much more severe, and the treatment often requires the use of the knife. *Fissure of the anus* is a term applied to an affection consisting in one or more cracks, excoriations, or superficial ulcerations, situated between the folds of the skin and mucous membrane at the verge of the anus, and only slightly involving the rectum. They give rise to intense pain during the passage of the evacuations, and for some hours afterwards to great discomfort, smarting, and itching. The treatment to be adopted is to endeavor to procure regular and somewhat soft evacuations, and to sponge with warm water immediately afterwards, the parts being dried with a soft cloth. One or two applications of solid nitrate of silver will sometimes cure the disease; and an ointment of oxide of zine, or one containing chloroform, will sometimes serve to allay the irritation and heal the parts.—*Pruritus ani*, which simply means intense itching and irritation of this part, is to be regarded as a symptom of certain morbid changes rather than as a special disorder; but is very common, and productive of much suffering. It is often associated with an unhealthy state of the intestinal secretions, or with simple constipation; with a congested state of the mucous membrane; with a disordered condition of the womb; with the presence of thread worms in the rectum, etc.; and it is peculiarly common in persons whose occupations are sedentary. The affection is often much aggravated by the patient's being unable to refrain from scratching the parts, which leads to excoriations, ulcerations, thickening of the skin, etc. The symptoms are usually most severe when the sufferer begins to get warm in bed. If the affection arise from worms, or a loaded state of the large intestines, enemata and purgatives will give immediate relief. If unhealthy excretions exist, attention must be paid to the diet, and the occasional administration of a pill containing some alterative and aperient as may be advised until relieved, together with the local application of soap and water to the parts, will often stop the itching. If there are any cracks or ulcers, nitrate of silver must be applied until they heal. To prevent the reappearance of these sores, the patient should bathe the parts night and morning with a strong solution of alum. An ointment composed of a drachm of calomel and an ounce of lard is strongly recommended by Mr. Smith, of King's College Hospital, when other means have failed; who also states that the daily introduction of a well-oiled bougie, made of black wax, will





Anvil.

Anubis, from an Egyptian painting.



Antwerp Cathedral.

## ANVIL—ANXIETY.

sometimes succeed in very obstinate cases. For other principal affections of the anus, see FISTULA: PILES: PROLAPSUS.

ANVIL, n. *ăn'vîl* [AS. *anfilt*; Low Ger. *ambolt*; Dut. *aenbeld*, a block to hammer on]. an iron block with a smooth face and a horn, on which smiths shape their work. ON THE ANVIL, in a state of formation and preparation; not yet matured.

ANVILLE, *ăn'vîl*, JEAN BAPTISTE BOURGUIGNON D': 1697-1782; b. Paris: celebrated French geographer. His first study of the ancient authors induced him to publish, at the age of 15, a map of Greece. His rare qualities gained the friendship of the Abbé de Songuerue, whose instructions were the source of his profound and extensive knowledge. He advanced the science of geography, both by his very numerous maps, and by his elaborate treatises. The principal portion of A.'s works, edited by M. de Maine, was published in 1834 by Levrault. But the death of M. de Maine, in 1832, stopped the quarto edition near the end of the twelfth volume. A. left 211 maps and plans, and 78 memoirs, the most of which are inserted in the *Recueil des Mémoires de l'Académie des Inscriptions et Belles-lettres*. His best map is that of Ancient Egypt. His *Orbis Veteribus Notus*, and *Orbis Romanus*, are of great value, as also his maps of Gaul, Italy, and Greece, both ancient and mediæval. His collection of maps was purchased in 1779 by the French government for the Royal Library.

ANWARI, *ăn'wâ-rê*, lived 12th c.; d. 1200-01; b. in the prov. of Khorassan: celebrated Persian poet; educated at the college of Mansur, at Tus. He emerged from obscurity in the course of a night. The story goes that the Seljukide sultan, Sanjar, happened on one occasion to visit Tus, when the imagination of the youthful poet was so excited by the presence of the monarch and his glittering retinue, that he resolved to write a poem in his praise. By next morning it was finished, and presented to Sanjar, who instantly placed the fortunate youth among his courtiers. A. turned his attention to astrology, which was his ruin; for having predicted that in 1185 or 1186 a hurricane would burst over all Asia, overthrow the most solid edifices, and shake the very mountains, and nothing of the sort really occurring, but, on the contrary, an entire year of remarkably tranquil weather, he fell into disgrace, and retired to Balkh, where he died. His poems consist chiefly of long panegyrics, and shorter lyrical effusions. The latter (*ghazels*) are characterized by simplicity, ease, and naturalness; but the *kasidas*, or long poems, are disfigured, like many other eastern poems, by glittering imagery and historical conceits. His *Elegy on the Captivity of Sanjar taken Prisoner by the Ghurides*, has been translated into English by Captain Kirkpatrick in the 1st vol. of *Asiatic Miscellanies* (Calcutta, 1785).

ANXIETY, n. *ăng-zî'č-tî* [F. *anxiété*, anxiety—from L. *an'xiētātem*, anxiety—from L. *an'xiŭs*, anxious; *ango*, I press tight (see ANGUISH)]: distress of mind about some-



## ANY—AORTA.

thing future; great uneasiness. **ANXIOUS**, a. *ānk'shūs*, literally, that chokes or strangles; distressed in mind; perplexed. **ANX'IOUSLY**, ad. *-lī*. **ANX'IOUSNESS**, n. the state of being anxious—**SYN.** of 'anxious': restless; disturbed; uneasy, unquiet; concerned; watchful;—of 'anxiety': care; solicitude; concern; uneasiness; foreboding; disquiet; disquietude; perplexity.

**ANY**, a. *ēn'nī* [**AS.** *ænig*; **Ger.** *einig*; **Dut.** *eenig*, one, only, and postfix *ig*]: every; whoever; one or some; one of many: in *Bible*, at all. **ANYWISE**, ad. *ēn'nī-wīz*, in any degree. **AN'YWHERE**, ad. *-hwār*, in any place. **ANYHOW**, ad. *ēn'nī-how*, at any rate, in any event; in a careless, slovenly manner. **ANYBODY**, n. *ēn'nī-bōd'ī*, one out of many selected indifferently. **ANYTHING**, n. indifference by way of selection; not one thing more particularly than another; a particular object. **ANY ONE**, n. no one in particular; 'one,' when preceded by a negative. **ANYWHILE**, ad. for any length of time.

**AONIAN**, a. *ā-ō'nī-ān* [from *Aōnīā*, a dist. in Greece, in which were Mt. Helicon and the fountain Aganippe; a haunt of the Muses]: pertaining to the Muses. **AONIDES**, n. *ā-ōn'ī-dēz*, a name for the Muses.

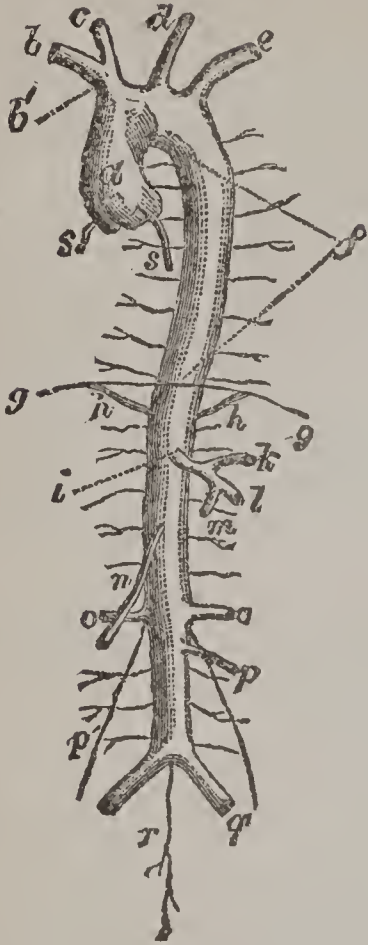
**AONLAGANJ'**, or **AOUN'LAH**: town of India, in the British dist. Bareilly, 21 m. s.w. of Bareilly, on the route to Allygurh. It has a large bazaar. **Pop.** (1871) 9,947.

**AORIST**, n. *ā'ō-rīst* [**Gr.** *āōris'tos*, unlimited]: a past tense in the grammar of the Greek language; a form of the Greek word by which an action is expressed as taking place in an indefinite time. The Greek language is especially fertile in the past tenses of verbs, having, in addition to the tenses common to other languages—the imperfect, perfect, and pluperfect—the **A.**, which is peculiarly adapted to the narrative style of writing. The distinction of first and second **A.** is merely formal. **AORISTIC**, a. *ā'ō-rīs'tīk*, pert. to.

**AORTA**, n. *ā-ōr'tā* [**Gr.** *ā'örtē*, the great artery—from *aei'rō*, I bear or carry]: the great arterial trunk which, rising from the left ventricle of the heart, sends its branches ramifying through the whole body. **AORTAL**, a. *ā-ōr'tāl*, or **AORTIC**, a. *ā-ōr'tīk*, pert. to. The **A.** in man is subdivided by anatomists into the Arch, the Thoracic **A.**, and the Abdominal **A.** The *arch* is a loop with the convexity directed upwards, forwards, and to the right side, reaching at its highest part to a level with the second piece of the breast-bone, and then descending to the left side of the third dorsal vertebra. Five arteries arise from the arch—viz., two coronaries, for the supply of the muscular tissue of the heart itself; the innominata; and the left carotid and left subclavian arteries. At the commencement of the arch are three small swellings or pouches, the aortic sinuses, below which are the three semilunar valves or folds of the lining membrane, which prevent regurgitation of the blood back into the heart. The *thoracic A.* extends from the third dorsal vertebra to the diaphragm, gradually

## AOSTA.

getting into the middle line of the spine. The thoracic A.



### Aorta:

*a*, ascending arch of aorta; *ss*, coronary arteries; *b'*, innominata artery; *b*, right subclavian; *c*, right carotid; *d*, left carotid; *e*, left subclavian; *f*, thoracic aorta; *gg*, diaphragm; *hh*, phrenic arteries; *i*, coeliac axis; *k*, coronary or gastric; *l*, splenic; *m*, hepatic; *n*, superior mesenteric; *oo*, renal arteries; *p*, inferior mesenteric; *p'*, spermatic; *q*, common iliac; *r*, middle sacral.

gives off the bronchial arteries (two or three) to supply the tissue of the lungs; and some small branches (three or four) to the œsophagus, and intercostal arteries, to supply the walls of the chest (ten on left, and nine on right side). The *abdominal A.* passes from the diaphragm to the fourth lumbar vertebra, opposite the lower margin of which it divides into the two common iliac trunks. The abdominal A. gives off the two phrenic arteries to the diaphragm; the coeliac axis, which divides into three large branches for the stomach, liver, and spleen; the superior mesenteric for the small, and part of the large intestine; the *renals* (two); the *supra-renals* (two), one for each kidney; the spermatic; the inferior mesenteric, for the part of the large intestine not supplied by the superior mesenteric; and four or five lumbar arteries, which supply the lower part of the abdominal walls (the loins).

Where the A. bifurcates, a small artery, the *sacramedia*, or *caudal* artery, arises, and passes along in the middle line; in fish and in animals with large tails, this branch is a continuation of the A.

The above is the usual arrangement; but occasionally it varies, especially in the number of arteries springing from the arch. For the structure of the A. see ARTERY; for the comparative anatomy, see HEART: CIRCULATION.

**AOSTA.** *â-ôs'tâ*: dist. of the prov. of Turin, n. Italy, surrounded by the highest elevations of the Alps, and watered by the river Dora baltea; area, over 1,200 sq. miles. The dense pine-woods on the hills, the alpine pastures on the slopes, the plantations of vines, almonds, olives, figs, and mulberry trees in the valleys, and the ores of silver, copper, and iron in the bosom of the mountains, supply occupation and means of subsistence; but the land generally is not adapted to the growth of corn, though maize, barley, oats, etc., are produced in the lowest portions of the valleys. The disease styled Cretinism (q.v.) prevails to a lamentable extent,



## AOUDAD—APAFI.

and few persons are altogether free from Goître (q.v.). Great numbers of the poorer class emigrate during winter into the richer countries in their vicinity, and earn a livelihood as chimney-sweepers, masons, and smiths. Pop. abt. 83,000.

**AOSTA**, the principal town, 49 m. n.n.w. of Turin, has trade in cheese, hemp, leather, etc. It was in ancient times the chief residence of the Salassi, a brave race of mountaineers, with whom Appius Claudius had to contend on his way into Gaul. They were finally destroyed by Terentius Varro in the time of Augustus. Monuments of the Roman times remain—a well-preserved arch, two gateways, the ruins of an amphitheatre, and a bridge. The celebrated baths and mines of St. Didier are in the neighborhood. St. Bernard, the founder of the famous hospice which bears his name, was Archdeacon of A.; and Anselm, Abp. of Canterbury, was born here. Pop. about 9,000.

**AOUDAD**, n. *â'ô-dād* [native name]: a ferocious species of wild sheep inhabiting n. Africa.

**APACE**, ad. *ă-pās'* [AS. *a*, on: F. *pas*; L. *passus*, a step]: with some degree of speed; in haste; quickly; by-and-by.

**APACHES**, *ă-pă'chāz*: tribe of American Indians of the Athabasca family, in Tex., Ariz., and N. M.; about 7,000. They are very warlike, great raiders, and strongly averse to civilized forms of life. The tribe comprises several semi-independent bands, and their great war chief is Geronimo. They gave the frontier settlers of Mexico, Ariz., and N. M., and the federal govt. much trouble for many years. Geronimo became known 1876, and was captured several times by U. S. troops, but almost invariably succeeded in escaping. He was considered by experienced army officers to be the most tricky, lawless, deceitful, treacherous, and murderous of living Indians. Gen. Crook chased his renegade band into Mexico 1883, and captured the chief and his followers. They were placed on a farm, and though Gen. Crook promised them protection as long as they behaved themselves, they soon tired of the restraint. Geronimo escaped from Fort Apache 1885, May 17—his third escape—was captured by Gen. Miles 1886, and was afterward confined in Fla. and Okl.

**APAFI**, *öp'pöf-ē*, **MICHAEL I.**, Prince of Transylvania: 1632–1690, Apr. 15. He belonged to an old family; accompanied Prince George II. in an expedition against the Poles 1656; was taken prisoner; and after his release lived at his paternal estate till 1661, when he was chosen prince of Transylvania. He reigned under the protection of Turkey till the siege of Vienna 1683, when the Austrian troops entered his territory, and 1687, Aug. 12, he made a treaty with the emperor by which Transylvania was placed under German protection. His death occurred on the eve of a fierce war begun by the Turks. His son, **MICHAEL II.**, succeeded to the throne. The Turks defeated the imperial army, and captured several cities; but the imperial troops regained everything, and A. was induced to surrender his territory to Austria for a pension. Michael II. died 1713.

## APAGOGUE—APATITE.

**APAGOGUE**, n. *ăp'ă-gō'jē* [Gr. *apagōgē*, a leading away—from *apo*, from; *ago*, I lead]: in *logic*, a kind of argument or proposition not very evident; in *math.*, the step leading from one proposition to another, when the first, after demonstration, is employed in proving the second or others. **APAGOGICAL**, a. *ăp'ă-gōj'î-kāl*, proving indirectly.

**APART**, ad. *ă-părt'* [F. *à part*, aside, separate; L. *partem*, a part]: aside; separately; at a distance. **APARTMENT**, n. [OF. *apartement*; F. *appartement*—from mid. L. *appartimen'tum*]: something set aside; a room in a house.

**APARTMENT-HOUSE**: a building designed to accommodate several families. The increased valuation of ground in large cities, as well as the economy in living, has led to the erection of such buildings. The apartment-house is fitted with all modern improvements for the comfort and convenience of its occupants.

**APATHY**, n. *ăp'ă-thĭ* [F. *apathie*, apathy; L. *apăthĭa*; Gr. *apathe'ia*, exemption from passion—from Gr. *a*, without; *păthos*, any emotion of the mind]: not any feeling; freedom from passion or feeling. **AP'ATHIST**, n. one destitute of feeling. **APATHETIC**, a. *ăp'ă-thăt'îk*, or **AP'ATHETICAL**, a. *ă-kāl*, wanting in feeling; insensible. **AP'ATHETICALLY**, ad. *-lĭ*.—**SYN.** of 'apathy': indifference; insensibility; unfeelingness; supineness; carelessness; unconcern.

**APATITE**, n. *ăp'ă-tĭt* [Gr. *apătē*, deception, from liability of this mineral to be mistaken for other substances]: a mineral consisting mainly of phosphate of lime (bone-earth), and which for some years past has been largely used in the preparation of manures. It is employed for the same purpose as bones or bone-ash—namely, to supply phosphoric acid to the soil. The massive radiated variety is sometimes called *phosphorite*, and when massive, earthy, and impure, it is also known as *osteolite*. Coprolites (q.v.), or phosphatic nodules, are likewise mainly composed of phosphate of lime. A. is found as a bedded rock, in compact spheroidal masses, in veins and dykes, and as an accessory constituent of rocks. It exists in nearly all geological formations, but is perhaps most abundant in the older metamorphic rocks. Extensive deposits of A. occur in various parts of the world. From Krageröe in Norway, where it occurs associated with granitic rocks, and from Estremadura in Spain, where it is found in cretaceous strata, it has been largely sent to England, the total imports of these mineral phosphates having in some years reached 5,000 tons. There is a bed of A., 18 inches thick, of Silurian age, at Llanfyllin in North Wales, which has been extensively worked. A remarkable deposit of a kind of A., or rather rock guano, which has been termed 'Sombrerite,' was discovered some years ago in the small island of Sombrero, situated about 60 m. to the e. of St. Thomas, in the West Indian group. It covers a great part of the island, which is about 1½ m. long by three-fourths of a m. in breadth. Mr. A. A. Julien, writing from the spot in 1864, says there 'is a natural division of the Sombrero Guano into two varieties—



one of an oolitic structure, of a great variety of colors, and containing, in addition to the bone ( $3\text{CaO}, \text{PO}_5$ ) and neutral ( $2\text{CaO}, \text{PO}_5$ ) phosphates of lime, the phosphates of alumina, iron, and magnesia, etc. The other variety, generally of a broad concretionary structure, is of a white or yellowish-white color, containing a little carbonate of lime, sulphate of lime, etc., but especially abounds in bone phosphate of lime. It is almost certain that the former more nearly resembles the original deposit, and is the older of the two; while the latter is far more uniform in composition. The guano is interlaminated with ordinary coral limestone. It is now believed that this hard or rock guano has been formed by water filtering through ordinary guano, into the coral rock adjoining, and turning it more or less completely into phosphate of lime. A similar hard guano occurs at Monk's Island, and one or two others in the Caribbean Sea. Large quantities have been introduced into the United States, under the name of Sombrero Guano, and are extensively employed by the manufacturers of artificial manures, in place of ordinary bone-ash. It is largely used in Britain also. The general treatment to which mineral phosphate is subjected, is to reduce it to powder, and act upon the pulverized matter with sulphuric acid, which renders the phosphoric acid in the A. soluble in water, and thereby facilitates its introduction into the plant. These substances require to be ground to a finer powder, and subjected to a more protracted digestion than bones. In the greater number of cases where the A. or Sombrero Guano is treated in this way, it is mixed with other manures, such as Peruvian Guano, blood, or true bones, and thus a complex substance is manufactured, which is much more acceptable to the plant than the simple A. or *mineral phosphate* itself. The great importance of mineral phosphate, in an agricultural point of view, arises from the fact that no mineral substance possesses more influence over the growth of the edible plants, such as wheat, barley, oats, turnips, etc., than phosphoric acid does; any cheap source of that substance, therefore, is a great boon. The island of Sombrero contains as much phosphatic or bony matter as is present in many millions of oxen, and represents as much manure as would be obtained by the employment of the bones of these cattle. It was first proposed to use A. as manure abt. 1856. The different varieties of A. contain a little fluoride or chloride of calcium, or both, as well as phosphate of lime. Of these varieties, besides those already mentioned, there are others, as *Moroxite*, *Francolite*, and *Asparagus Stone*. It occurs both massive and in crystals—which are generally small, and are often six-sided prisms, or six-sided tables, but some very large ones have been brought from Canada. It occurs in some of the tin mines in Cornwall, Saxony, Bohemia, etc., and in rocks of various ages, as mentioned above. It is of various colors, more or less green, blue or red, sometimes white and often gray. In Spain, A. is used as a building stone.

APE, n. *āp* [AS. *apa*: Icel. *api*: Dan. *abe*]: a kind of monkey; a vain imitator; a mimic: V. foolishly to try to

## APE—APELLES.

imitate. AP'ING, imp. APED, pp. *āpt*. AP'ER, n. one who. APISH, a. *āp'ish*, like an ape; foolish; imitating the manners of superiors. AP'ISHLY, ad. *-lī*. AP'ISHNESS, n. foppery.—SYN. of 'ape, v.': to mimic; imitate; mock.

APE: name commonly given to the tailless monkeys. See BARBARY APE: CHIMPANZEE: GIBBON: GORILLA: ORANG-OTANG, etc. It was originally commensurate in significance with monkey, and the terms were indiscriminately used. The origin of the word is uncertain. See MONKEY.

The worship of apes or monkeys has been common among pagan nations from remote antiquity, and still prevails extensively, being practiced in Japan, in India, and by some of the African tribes. The source of it is, perhaps, to be found partly in the doctrine of the transmigration of souls, and partly in the qualities which apes have been supposed to possess in a conspicuous degree, and of which they have been made symbolic. An A.'s tooth, kept in a temple in Ceylon, was regarded with extraordinary veneration, and immense wealth was accumulated through the continual offerings of the worshippers; but the temple was plundered, and the tooth carried away by the Portuguese in 1554.

APEAK, or APEEK, ad. *ā-pēk'* [*a* and *peak*: F. *à pic*, perpendicularly—from *pic*, a peak, a point]: on the peak or point; in a posture to pierce; a maritime term signifying the position of an anchor when the cable has been drawn so tight as to bring the ship directly over it; the sailors then say that 'the anchor is apeak.'

APELDORN, *ā'pēl-dōrn'*: a beautiful village in the Netherlands, province of Gelderland, about 17 m. n. from Arnhem, on a canal which joins the river Grift, a branch of the Yssel, by which, and the public roads from Arnhem and Utrecht to Deventer and Zutphen, and by railway, it has much traffic. The Loo, a hunting-lodge of the king, is in the neighborhood. The principal industries are agriculture, making paper, grinding corn, founding copper, manufacturing blankets and coarse woollen cloth, etc. Pop. of A. (1901) 27,586.

APELLES, *a-pēl'ēz*: the most celebrated painter in ancient times: lived in latter part of B.C. 4th c., prob. abt. B.C. 352–308; son of Pythias. b. probably (according to Suidas), at Colophon, on the Ionian coast of Asia Minor; though Pliny and Ovid call him a Coan, and Strabo, and Lucian an Ephesian. This, however, may simply refer to the fact that he was made a burgess of that town. He received his first instruction in art in the Ionian school of Ephesus, then studied under Pamphilus of Amphilopolis, and latterly at Sicyon, under Melanthius; and thus he united the fine coloring of the Ionian with the accurate drawing of the Sicyonic school. During the time of Philip, A. visited Macedon, where he became the intimate friend of Alexander the Great. It was probably at the Macedonian court that the best days of A. were spent. Pliny relates that on one occasion when Alexander visited A. in his studio, the king exhibited such ignorance of art, that A. recommended him to be silent, as the boys who were grinding the colors were laughing



at him. But the same story is told of Zeuxis and Megabyzus. He afterwards visited Rhodes (where he was familiar with Protogenes), Cos, Alexandria, and Ephesus. The period of his death is not known; but as he practiced his art before the death of Philip, and as his visit to Alexandria was after the assumption of the regal title by Ptolemy, he lived, probably, between the dates above stated. The most celebrated paintings of A. were his *Anadyomene*, or *Venus Rising from the Sea*, with a shower of silver drops falling round her like a veil of gauze; the Graces, and similar subjects; but he cultivated the heroic as well as the graceful style. His ideal portrait of Alexander wiclding a thunderbolt was highly esteemed, and preserved in the temple of Diana at Ephesus. With reference to this painting, Alexander said: 'There are only two Alexanders—the invincible son of Philip, and the inimitable Alexander of A.' A. is said to have left an incomplete painting of Venus, to which no other painter would presume to give the finishing touches. The disposition of A. was remarkably free from envy, and he willingly acknowledged the merits of his contemporaries. Amphion, he said, excelled him in grouping, and Asclepiodorus in perspective, but *grace* was his alone. On coming to Rhodes, and finding that the works of Protogenes were not appreciated by his countrymen, he at once offered him fifty talents for a picture, and spread the report that he intended to sell it again as his own. The industry with which he practiced drawing was so great as to give rise to the proverb, *Nulla dies sine lineâ*. Many other anecdotes are related of A. When his pictures were exposed to public view, he used to place himself behind a picture, to listen to the criticisms of the common people. A cobbler having detected a fault in the shoe of one of his figures, it is said that A. instantly rectified it; but when the cobbler, on the following day, extended his criticism to the legs, the painter rushed from his hiding-place, and told the cobbler to stick to the shoes; or, in the Latin version, which has become proverbial, *Ne sutor supra crepidam*.

APENNINES, n. *ăp'ĕ-nĭnz* [Ital. *Appenni'ni*; anciently, Lat. *Mons Apenninus*]: a mountain-chain extending uninterruptedly through the whole length of the Italian peninsula, between 37° and 44° 30' n. lat., and 7° 40' and 18° 20' e. long.; belonging to the system of the Alps, from which it branches off at the Col de Tenda, near the sources of the Tanaro. From this point, the chain, under the name of the Ligurian A., girdles the Gulf of Genoa, in the immediate vicinity of the sea, and then runs inland to a considerable extent, forming the water-shed between the Adriatic and the Mediterranean, but gradually approaching the e. coast, till, in the highlands of the Abruzzi, it is close upon it; after which it takes a s.w. direction through Naples, dips under the sea at the Strait of Messina, and reappears on the n. coast of Sicily. Recent geographers divide the A. as follows: 1. *The North A.*, from the Col de Tenda in the Maritime Alps to the pass of Borgo San Sepolcro, in the neighborhood of Arezzo, on the e. border of Tuscany. 2. *The Central A.*, from

## APENNINES.

Arezzo to the valley of the Pescara, which flows between the two Abruzzi. 3. *The South A.*, from the valley of the Pescara to Cape Spartivento. 4. *The Insular A.*, or the Sicilian range. The leading feature of the A., wherever they approach the coast, is their extraordinarily steep declivities; while in Middle Italy and the adjoining portions of Upper and Lower Italy, long-terraced plateaus, lower ranges, and, finally, extensive coast-plains, mark their gradual descent on the w. The general name for these lower ranges is *Sub-Apennine*; but they have a variety of particular designations, such as, the mountains of Carrara and Seravezza, Pratomagno and Monte Amiata, in Tuscany; the Sabine, Alban, and Volscian mountains, in the former papal states; Monte Gargano on the s.e. coast, n. of Manfredonia, etc. The main chain of the A. does not send off spurs into the Apulian peninsula, or heel of Italy, which, for the most part, is rather level, or only interspersed with detached groups of hills.


The direction of the great chain of the A. is favorable to the formation, on the w. side, of important river-basins, such as those of the Arno, the Tiber, the Garigliano, and the Volturno; while on the e. side we find nothing but small streams, in most cases destitute of affluents, hurrying down to the sea through wild, precipitous valleys. In n. Italy, the Ligurian A., almost overhanging the Gulf of Genoa, can only develop on the s. puny streams, while the n. sends down, through the plains of Piedmont, large tributaries to the Po.

The average height of the entire chain of the A. is about 4,000 ft., which, however, in the n. sinks down to little more than 3,500 ft.; and in the mountains of the Abruzzi rises to 7,000 feet. Here, in Monte Corno, the highest peak of the range known under the name of Gran Sasso d'Italia, they reach an elevation of 10,200 ft., and in Monte Velino, of 7,850 feet. The North A. attain, in Monte Cimone, situated in the s. of Modena, a height of 6,973 ft.; the South A., in Monte Amara, a height of 9,000 ft.; the Insular A., if we exclude the isolated peak of *Ætna*—in Pizzo di Case, a height of 6,500 feet.

The A. are crossed by thirteen principal passes: these are, proceeding from n. to s.: 1. The Pass of Savona; 2, of Bocchetta; 3, of Cisa; 4, of Monte Cimone; 5, of Porretta; 6, of Pietramala; 7, of Borgo San Sepolcro; 8, of Furlo; 9, of Serravalle; 10, of Aquila; 11, of Isernia; 12, of Arcano and Troja; 13, of Potenza. The prevalent stone is a species of compact limestone, of a whitish-gray color, belonging to the Jura formation. Resting on the limestone is a more recent formation of sandstone and marl, especially abundant in the middle region of the Sub-A., containing an extraordinary number of petrifications, and reckoned as belonging to the upper division of the Parisian limestone. Older formations, however, frequently crop out. Thus, on the watershed of the North and Central A. there are found transition clay-slate, grauwacke-slate, etc. The A., especially the Roman and Neapolitan, are distinguished from all other mountain-chains by the rich variety of marbles



## APENRADE—APETALOÛS.

which they contain. In some places the quarries seem  exhaustible. Volcanic rocks are numerous in the middle and s. regions, where the agency of fire has caused very wonderful formations, as, for instance, the crater-lakes of Albano, Nemi, Vesuvius, Solfatara.

The principal chain exhibits, for the most part, a dreary and barren appearance; it looks like a vast wall, with very few projecting peaks to break the dull monotony of the scene, and therefore seldom furnishes any salient points on which the eye of the spectator can rest with pleasure. Naked, riven, covered with thick *débris*, the declivities seem as if scorched by the southern sun. Only in the Abruzzi, in the Sub-A., and above all, in the marble mountains of Carrara and Seravezza, do the bold and magnificent forms of the Alps reappear. Where the A.—in general so poorly supplied with streams—exhibit a trace of Alpine abundance of water, there is no lack of rich pastures and dense forests, but usually only thin grass and wild scrubby bushes cover the stony slopes. The greater number of the roaring forest brooks, in the deep rocky ravines, disappear during summer, leaving a dry bed. Where the mountains dip down to the sea, as at the Riviera of Genoa and the Gulf of Naples, a rich, peculiarly southern vegetation clothes the declivities. Gigantic agaves, Indian figs (*Cactus Opuntia*), myrtle-bushes, orange-groves, hint in these northern lands of the splendors of the tropics. Up to 3,000 ft. of elevation, cornfields, fruit-bearing chestnuts, and deciduous oaks are found. Beyond this, all vegetation often ceases on the steep and stony sides of the mountains; but at other times the beech or the fir appears in dense forests. There is no region of perpetual snow; but the summits of the Abruzzi and the lofty peaks of Lunigiana are often covered with snow from October far into May, and send their icy breath so suddenly down into the mild valleys that the temperature in a few hours sinks 12°–18° F., and a warm spring afternoon is succeeded by a cold December evening. APENNINE, a. pertaining to the Apennines.

APENRADE, *â'pén-râ'dè*: town in the Prussian prov. of Schleswig-Holstein; at the bottom of a gulf in the Little Belt; with an excellent harbor and considerable shipping. The environs of the town are beautiful. The first historical mention made of A. relates to its destruction by the Slaves in 1148; and, indeed, its position has always laid it open to the casualties of northern war, whether on a large or small scale, as has been especially seen since 1848. Near the town stands the castle of Brundlund, built by Queen Margaret in 1411, in which the bailiff of the place resides. Pop. (1894) 5,933.

APERIENT, n. *ă-pēr'î-ěnt* [L. *aperien'tem*, opening]: a medicine that opens the bowels; a laxative: ADJ. opening; gently purgative. APERTIVE, a. *ă-pēr'î-tîv*, purgative.

APERTURE, n. *ăp'ér-tūr* [L. *apértură*, an opening—from *aperiō*, I uncover]: an opening; a cleft or gap.

APETALOÛS, a. *ă-pět'ă-lūs* [Gr. *a*, without; *pétalon*, a

flower-leaf]: in *bot.*, having no petals or flower-leaves. APET'ALOUS'NESS, n.

APETALOUS: a term in Botany, applied to flowers or to flowering plants, and signifying that they are destitute of petals or corolla (q.v.). When both the calyx and corolla are wanting, the flower is said to be *achlamydeous* (from the Greek *chlamys*, a covering), or naked. The absence of the whorl of petals sometimes occurs in an exceptional manner in orders or genera ordinarily characterized by its presence. In some plants, as in certain species of the order *Caryophyllaceæ*, petals are sometimes present, sometimes absent, a tendency apparently existing to the suppression of this whorl.

APEX, n. ā'pěks, APEXES, n. plu. ā'pěks ěs, or APICES, n. plu. āp'ĩ-sěz [L. *apex* or *āpicem*, a point]: the top point or summit of anything. APICAL, a. āp'ĩ-kāl, relating to the top. APICULUS, n. ā-pík'ũ lūs [dim. of *apex*]: in *bot.*, a short but sharp point in which a leaf or other organ terminates, but not very stiff. APICULATE, a. ā-pík'ũ-lāt, suddenly terminated by a distinct point.

APHÆRESIS or APHERESIS, n. ā fě'rě-sīs [Gr. *aphairēsis*, a taking away, abstraction—from *apo*, from; *hairēō*, I take or seize]: the taking away a letter or syllable from the beginning of a word.

APHANIPTERA, n. āf'ān-ĩp'těr-ā [Gr. *aph'anēs*, unseen, not apparent—from *a*, not; *phainō*, I show; *pteron*, wing]: old order of insects, comprising fleas, apparently without wings. APH'ANIP'TEROUS, a. -ūs, pert. to.—Fleas are now classified in the order *Diptera*.

APHANITE, n. āf'ān-īt [Gr. *apha'nēs*, obscure, not apparent—from *a*, not; *phainō*, I bring to light]: a compact sort of trap-rock, consisting of hornblende, quartz, and felspar so intimately combined that they cannot be individually distinguished. APHANISTIC, a. āf'ān ĩs'tík, pertaining to; indistinct.

APHASIA, n. ā-fā'zhĩ-ā [Gr. *apha'siā*, inability to speak from amazement or fear—from *a*, not; *phāō*, I speak]: in *med.*, loss of the cerebral faculty of speech; loss of the memory of words: term adopted by the eminent French physician, Trousseau, to denote a remarkable symptom of certain conditions of the nervous system in which the patient is more or less unable to express his thoughts in speech. The disease has been casually noticed by many earlier observers, among whom was Dr. Parry, of Bath, Eng.; but not until the last twenty years has it received the attention which its great singularity demands. Before receiving its present name, it had been termed *Aphemia* (from *a*, not, and *phemi*, I speak), and *Alalia* (from *laleo*, I talk). Voisin, in an elaborate Memoir on this subject, 1865, observes that it may be due to several causes. It may be congenital or acquired, and in the latter case is due to some form of lesion or injury of the anterior lobes of the brain. This fact was observed as long ago as 1825 by Bouillaud; but in 1861, during a discussion of the Anthropological Soc. of Paris as



## APHASIA.

to whether certain faculties, such as language, are or are not localized in special parts of the brain, Broca advanced the view that the faculty of language has its seat not only in the anterior lobes, but in the left lobe, and occupies exactly the external left frontal convolution, where the anterior lobe meets the middle lobe immediately in front of the fissure of Sylvius. This singular conclusion was deduced from only two post-mortem examinations which had just occurred at the Bicêtre, but a number of previously published cases supported it; and Dr. Hughlings Jackson, of the London Hospital, 'has seen about 70 cases of loss or defect of speech with hemiplegia, and in all but one the hemiplegia was on the right side, indicating disease of the *left* side of the brain.' —*Lancet*, 1864, Nov. 26. Moreover, in the two cases which during the year last named proved fatal in the Edinburgh and Glasgow infirmaries, Dr. Sanders and Dr. Gairdner traced the disease to the *exact spot* described by Broca. It may be caused by wounds, tumors of various kinds, including hydatids, or by softening of the left anterior lobe, and has occasionally, but very rarely, been found in association with lesions of other parts of the cerebrum, and even of the cerebellum and spinal cord. According to Voisin, in 146 cases, the left anterior lobe was affected in 140, and the right in only 6 cases. A variety of A. has been noticed in typhoid fever and in the first stage of small-pox; also in certain chronic cachexias or intoxications, as, for example, in syphilis and chronic alcoholism; and there are cases in which the affection is purely nervous, and results from epilepsy, an over-taxed brain, etc. The patients in whom true A. from disease of the brain occurs are excellently described by Dr. Gairdner in his essay *On the Functions of Articulate Speech*, etc. (Glasgow, 1866). This description, in a condensed form, is as follows: These patients have been the subject of some form of disturbance of the cerebral functions, sometimes with, but sometimes without, a manifest disturbance of the intellect. It may have been epilepsy or apoplexy, in which latter case, as has been already noticed, there is often paralysis, almost invariably on the right side of the body. This paralysis may be of any extent of completeness, but in many cases the patient has such command over the movements of the tongue and lips as to show that it is not from paralysis his speech is affected. The states of intellect and consciousness are equally variable, the patient occasionally appearing and behaving as if he were in perfect bodily and mental health, except for the A. Moreover, the A. shows itself in most varied forms. In the more trivial cases it is little more than an aggravation of the common defect of forgetting, or being unable to recall the name of a person or thing when wanted. Dr. Gairdner records the case of what he calls 'an aphasic,' who could conduct an ordinary conversation pretty well, but who could not name the days of the week, and would, for instance, call Monday 'the first working-day,' and who had forgotten, or could not give utterance to his own name. Sometimes a patient will perfectly articulate such expressions as these: 'I want —, I want —, Where's the —,' almost always

## APHELION—APHIS.

stopping short at the name of the object. Sometimes the patient's vocabulary is limited to one or two common words, as 'Yes' or 'No'; or perhaps he utters only one or more unintelligible words, as in the case of one of Trousseau's patients, who for four months uttered nothing but '*Cousisi*' to every possible question, unless when in moments of great irritation, and he would then articulate '*Sacon, sacon*'—probably an abbreviation for a French oath. Strange to say, certain aphasics who can articulate absolutely nothing else, can swear with perfect facility. Such exclamations as 'Oh!' 'Dear me!' 'God bless my life!' and 'D—n it!' are often the only utterances of these patients. Dr. H. Jackson, in a Memoir on Aphasia, in the first volume of the *London Hospital Reports*, has made some excellent remarks on this peculiarity, which are well worthy of perusal by all who study mental philosophy. He ingeniously regards an oath not as a part of language, but as 'a sort of detonating comma.' The general reader may also read with advantage the histories of two cases recorded by Trousseau, in which Frenchmen of high mental capacity, and well acquainted with the disease (one of them an eminent physician in Paris, who had specially studied the diseases of the brain; and the other, Prof. Lordat, of Montpellier), have passed through attacks of A., have recovered, and have described their own cases.

A. may be either temporary or persistent; in the former case being due to loss of nervous energy, congestion, or some other functional disorder; while in the latter case it is probably associated with disease of structure. It is unnecessary to describe the treatment, which varies according to the peculiarity of each individual case, and must be left to the physician.

APHELION, n. *ă-fē'lyŭn*, APHELIA, n. plu. *ă-fē'li-ă* [Gr. *apo*, from; *hēlios*, the sun]: that point in the elliptical orbit of the planet which is most remote from the sun. The opposite point, or that nearest to the sun, is the PERIHELION. At the former point, the swiftness of the planet's motion is least, and begins to increase; at the latter, it is greatest, and begins to decrease. This irregularity of motion is most remarkable in comets whose orbits deviate most from the circle. The motion of the comet of 1680, at its perihelion, was calculated as 137,000 times more rapid than its motion in A. See APSIDES.

APHIS, n. *ă-fīs*, APHIDES, n. plu. *ăf'iz* [L.]: genus of insects belonging to the order Hemiptera, sub-order Homoptera—type of a family called *Aphididae*. They are small insects, often called plant-lice, which suck the juices of plants or trees which they thus injure and sometimes destroy. Different species, of which there are several hundred, prey on different portions of the plant or tree; but no part, from the root to the leaf, is exempt from their attacks. The woolly A. (*Schizoncúra lanigera*), often destructive to young apple trees, appears in two forms, one of which preys on the roots and the other on the trunks and branches. It secretes a woolly substance which tends



## APHIS.

to protect it from dampness in the soil and from enemies above ground. The *A. mali* attacks the leaves and young twigs of the apple. Other species prey on the cherry, peach, and other fruit trees, and on the willow, white pine, and other ornamental and timber trees. A species which preys on the plum migrates to the hop plant and often does great damage (see HOP FLY). The *Anthomyia bras-*



Apple Aphis (*Eriosoma Mali*):

**a**, wingless insect, magnified; **b**, wingless insect in excrescence of the tree, magnified.

*sicæ* is exceedingly destructive to the cabbage and turnip, and nearly all field, garden, and greenhouse plants are subject to injury by some species of *A.* The principal remedies are: for the root *A.*, either kainit or refuse tobacco powder mixed through the soil by digging; and for those which work above ground, the use of kerosene emulsion (see EMULSION) or of a decoction of tobacco.



Apple Aphis:

**a** branch with excrescences, reduced.

Whatever tends to keep the plants and trees in vigorous condition will tend also to prevent attacks by the *A.*, and will lessen the degree of injury if an attack is made. It is very common to see the leaves of trees and shrubs deformed by red convexities. In the hollows of the under side of these, aphides live and find their food; the exhausted leaf at last curls up. They have a proboscis (*haustellum*), by which they pierce

## APHLOGISTIC—APHONIA.

and suck plants; and at the extremity of the abdomen, two horn-like processes, from which exude frequent small drops of a saccharine fluid called *Honey-dew*, a favorite food of ants. It has been seen even to fall in a kind of shower from trees much covered with aphides. For the means which ants take to obtain this food, see ANT. The legs of aphides are long, and they move slowly and awkwardly by them. The greater number of them never have wings; it is in the



Potato Aphis (*Aphis vastator*):  
magnified fifty times.

autumn that perfect winged insects generally appear. From the pairing of these result eggs, which produce female aphides in the following spring, and successive generations of wingless aphides are produced in a viviparous manner without impregnation throughout the summer, after which winged aphides again appear. Their increase is restrained not only by birds, but by insects which feed on them. A family of coleopterous insects, to which the genus *Coccinella* or Lady-bird (q.v.) belongs, has received upon this account the name of *Aphidiphagi*, or aphid-eaters. There are also certain minute hymenopterous insects, which destroy them in great numbers by depositing their eggs in them; the larva feeds upon the living A., out of which it at last eats its way, leaving a mere desiccated skin.

APHLOGISTIC, a. *ăf'łō-jîs'tîk* [Gr. *a*, without; *phlogîzo*, I burn up]: flameless.

APHONIA, n. *ă-fō'nî-ă*, or APHONY, *ăf'ō-nî* [Gr. *a*, without; *phônē*, voice]: a loss of voice: distinct from mutism, in which it is impossible to form articulate sounds, and in most cases the voice is not entirely gone, but only more or less suppressed. The voice is essentially produced (see VOICE) by three distinct agents—viz., (1) the expiration of air, (2) the opening of the glottis, and (3) the tension of the vocal cords; hence anything interfering with expiration, or with the functions of the glottis and vocal cords, may cause aphonia. Thus, it may result from paralysis of the respiratory muscles, from pulmonary emphysema, and sometimes from pneumonia; or it may be caused by diseases of the larynx, as chronic laryngitis, œdema of the glottis, polypus, etc.; or by pressure on the larynx caused by abscesses, vegetations, and any kind of morbid growth; or it may be traced to some functional or organic disturbance of the inferior vocal cords. Thus, the muscular fibres which



act on these cords may become affected in acute laryngitis by extension of the inflammation, or their action may be impeded by the pressure of false membrane in croup. In typhoid fever, the A. so commonly observed is due to ulceration extending to these structures. Again, in cases of lead or phosphorus poisoning, there is A. due to fatty degeneration of these muscles. Not unfrequently, A. may be traced to compression of the recurrent or inferior laryngeal nerve, which is the nerve supplying motor power to all the muscles of the larynx, with one trifling exception.

Such pressure is not unfrequently caused by an aneurism, an abscess, tumor, etc. In the same way, a wound or contusion of the pneumogastric nerve, or one of the recurrent branches, will cause A., or, more commonly, an extremely hoarse modification of the voice, in consequence of the laryngeal muscles being paralyzed on one side, and remaining active on the other. There are cases of direct nervous action being interfered with; but there are many cases of what may be termed *reflex A.*, as when the voice is often more or less lost in the course of pregnancy when accompanied with convulsions, or in consequence of the presence of intestinal worms, or after the rapid suppression of an exanthematous rash, or of a long-continued hemorrhagic discharge. Aphonia is, moreover, very commonly associated with hysteria.

When aphonia is not due to irremovable causes, as tumors pressing on the recurrent nerve, fatty degeneration of the laryngeal muscles, etc., it generally disappears after a longer or shorter interval. It occasionally assumes remarkable intermittent shapes. In one instance, the affection came on regularly at the same time of the year for seventeen years, beginning daily at noon, and lasting the remainder of the day, for a period varying from three to seven months. Another case is recorded in which, during fourteen years, a young woman could speak only during two or three hours daily.

In those cases which are amenable to treatment, emetics, electricity, strychnine, leeching, blistering, croton-oil liniment, and internal application of nitrate of silver, have been found the most useful remedies.

APHORISM, n. *ăf'ô-rîzm* [Gr. *aphoris'mos*, a definition — *apo*, from; *hōrîzō*, I mark bounds or limits]: a phrase limited or terminated in its meaning; a short sentence expressing some important truth; a maxim, such as 'Habit is second nature.' The aphoristic style continued through extended writings, is at times impressive, but too long continued it grows wearisome. APHORISTIC, a. *ăf'ô-rîs-tîk*, or APH'ORIS'TICAL, a. *-tî-kāl*, expressing some truth in a short sentence. APH'ORIS'TICALLY, ad. *-lî*. APH'ORIST, n. *-rîst*, one who.—SYN. of 'aphorism': proverb; apothegm; byword; axiom; maxim; saying; adage; saw; truism; principle.

APHRITE, n. *ăf'rît* [Gr. *aphros*, froth or foam]: a scaly variety of calcareous spar, having a shining pearly lustre and a greasy feel.

## APHRODISIAC—APICAL.

**APHRODISIAC**, a. *ăf' rō-dīz' ŭ-ăk* [Gr. *aphrodis' ŭs*, pertaining to Venus]: that which excites to sexual intercourse.

**APHRODITE**, *ăf' rō-dī' tē*: the Greek name of Venus; according to various traditions, derived from *aphros* (foam), in allusion to the old poetical myth which represented the goddess as springing from the foam of the sea. See **VENUS**: **APELLES**. *Aphrodisia* were festivals celebrated in honor of A., in numerous cities of Greece, but especially in Cyprus. At Paphos, in this island, was her most ancient temple. Bloodless sacrifices alone were imagined to please A., such as flowers, incense, etc. Mysteries of an impure kind formed part of the ceremonial of the aphrodisia. Aphrodisia were no doubt held in the other places where A. was worshipped, such as Cythera, Sparta, Thebes, Elis, etc., though they are not mentioned. At Corinth and Athens, the Aphrodisia were celebrated principally by prostitutes.

**APHTHÆ**, n. *ăf' thē* [Gr. *aphthai*, ulcers in the mouth]: small white specks or sores on the tongue, gums, palate, etc.; the thrush; small vesicles formed of the superficial layer of a mucous membrane, elevated by fluid secreted by the latter. They are usually whitish in color, and the fluid may be serous or puriform. At the end of a few hours or days, the aphthous vesicle bursts at its summit, and shrivels up, exposing an inflamed and painful patch of the mucous membrane. The most common site of A. is the mucous membrane of the lips and mouth, but they occasionally appear wherever the mucous membrane approaches the skin. Infants are liable to an aphthous eruption termed *thrush* (q.v.). A. in adults are generally the consequences of fevers and other diseases, or a symptom of disturbance of the digestive system. In some cases of pulmonary consumption, they form a painful addition to the patient's sufferings. In ordinary cases of A., a preparation of borax, or some astringent wash, generally effects a rapid cure. **APH'THOUS**, a. *ăf' thŭs*, pertaining to thrush, or ulcerous affections of the mouth. **APHTHOID**, a. *ăf' thoyd* [Gr. *eidōs*, resemblance]: resembling aphthæ.

**APHTHONG**, n. *ăf' thōng* [Gr. *α*, without; *phthonggos*, a sound]: a silent letter or letters.

**APHYLLOUS**, a. *ăf' fŭl' lŭs* or *ăf' -*! [Gr. *α*, without; *phulon*, a leaf]: in *bot.*, destitute of leaves; having leaves suppressed. **APHYLLY**, n. *ăf' ŭl- lŭ*, the suppression or want of leaves.

**APIA**, *ă' pē-ă*: principal town and commercial emporium of the Samoan or Navigator's Islands, in the S. Pacific Ocean, lat. 13° 30'—40° 30' s., long. 169°—173° w. It is on the n. coast of Upolu, about midway between the e. and w. extremities of the island, which is divided into three parts, Ania at the e., Se Tuamasaga in the centre, and Aana at the w. end. A. also is divided into three parts or villages, which are separated by small streams. Vessels generally make the e. end of Upolu and run w., keeping the reef about one m. distant till off the harbor of A., where



pilots are taken on board, and numberless little frail canoes containing natives cluster around. During Pres. Grant's administration, a kind of American protectorate over the islands was established, with Albert Barnes Steinberger in charge. This subsequently (1886) gave way to German occupation, though the United States and England had large commercial interests in the islands as well as Germany. After a series of native outbreaks and revolutions, the Germans deposed King Malietoa and exiled him to the Marshall Islands, and recognized Tamasese as his successor. The natives apparently preferred American to German protection and banded themselves under Malietoa's principal chief, Mataafa. Dissensions soon arose between the natives and the German consul, and later between the latter and American merchants; and these in time led to official acts by the German authorities against both the natives and American business representatives that were deemed unwarranted to the former and hostile to the latter. In 1888 a kind of civil war broke out, in which Germany claimed that the natives under Mataafa were encouraged and directed by an American citizen. The question of the govt. of Samoa then became one for diplomatic action. United States, England, and Germany agreed to a convention to be held in Berlin for the settlement of all questions in dispute and a new treaty was signed there by representatives of the three nations 1889, June 14. In the meantime the American men-of-war *Trenton*, *Vandalia*, and *Nipsic*, the English *Calliope*, and the German *Adler*, *Olga*, and *Eber* were sent to A. to protect the several national interests. On the afternoon 1889, Mar. 15, a hurricane suddenly broke over the harbor, and raged with fury till the next day. Though each vessel attempted to steam out to sea the *Calliope* alone succeeded in doing so. On the 16th the *Trenton* (flagship of Rear-admiral Kimberly), *Vandalia*, *Eber*, *Adler*, and *Olga* were wrecked on the reefs, and the *Nipsic* grounded and greatly injured. The loss of life was, Americans, 4 officers, 46 men; Germans, 9 officers, 87 men; total 146. Apia was again brought into notice when, 1899, April 1, a combined American and British naval force landed and had several officers killed and wounded in trying to end a revolt growing out of the struggle of Mataafa and Malietoa Tanus for the kingship. See SAMOA.

**APIARY**, n. *ā'pī-ār'ī*, **A'PIAR'IES**, n. plu. *-ār'īz* [*L. apīā'rīum*, a bee-house—from *apis*, a bee]: a stand or shed for bees; a place where bees are kept. See BEE. **A'PIAR'IST**, n. one who rears bees. **A'PIA'RIAN**, a. *-ā'rī-ān*, relating to bees. **APICULTURE**, n. *ā'pī-kŭl'tŭr* [*L. cultŭra*, a cultivating]: rearing of bees for their honey and wax.

**APICAL CELL**: terminal cell of a growing shoot, or (beneath terminal cap) of a root, which, by continual subdivision, produces growth.

## APICIFIXED—APIOS TUBEROSA.

**APICIFIXED**, a. *ă-pîs'î-fîkst* [L. *apex* or *ăpîcem*, a point: Eng. *fixed*]: in *bot.*, fixed apex to apex, as the apex of the filament attached to the apex of the anther.

**APICIUS**, *a-pîsh'î-us*, **MARCUS GABIUS**: a Roman epicure, in the times of Augustus and Tiberius; celebrated for his luxurious table and his acquirements in the art of cookery. When, by the gratification of his favorite indulgence, he had consumed the greater part of his fortune, and had only some \$400,000 left, he poisoned himself, in order to avoid the misery of plain diet. Two other gourmands—one in the time of Pompey, the other in the reign of Trajan—are mentioned under the name Apicius. The Roman cookery-book, *Cœlii Apicii de Obsoniis et Condimentis sive de re Culinariâ* (libri decem), ascribed to A., belongs to a much later time, inasmuch as it abounds in inaccuracies and solecisms. Its author, *Cœlius*, has thought proper to recommend his work to gourmands by affixing to it the celebrated name of Apicius.

**APIECE**, ad. *ă-pēs'* [AS. *a*, to or on, and *piece*<sup>1</sup> to each, as a separate share.

**APIOCRINITE**, n. *ăp'î-ôk'rîn-î-t* [Gr. *ăpîôn*, a pear; *krinon*, a lily]: a fossil crinoid, abundant in the Bradford clay; the pear-encrinite.

**APION**, *a-pî-ôn*, Greek grammarian: b. at Oasis, a town in Libya, but educated in Alexandria, which he affected to consider his birthplace, from a desire of being thought a pure Greek. He studied under Apollonius, the son of Archibius, from whom he acquired an admiration of Homer, and afterwards went to Rome, where he succeeded Theon as teacher of rhetoric. He was as remarkable for his loquacious vanity as for his knowledge. He declared that himself, and every one whom he mentioned, would be held in immortal memory; that he was equal to the first philosophers of Greece, and that Alexandria should be proud of him. From his bragging, Tiberius used to call him *Cymbalum Mundi* (the cymbal of the universe).

With the exception of one or two fragments, the whole of A.'s numerous writings are lost. He composed a work on the text of Homer, partly in the form of a dictionary, frequently referred to by subsequent authors; a work on Egypt, which contained the far-famed story of *Androclus and the Lion*, preserved by Aulus Gellius; a work against the Jews; one in praise of Alexander the Great; another on the great epicurean Apicius; histories of various countries, etc.

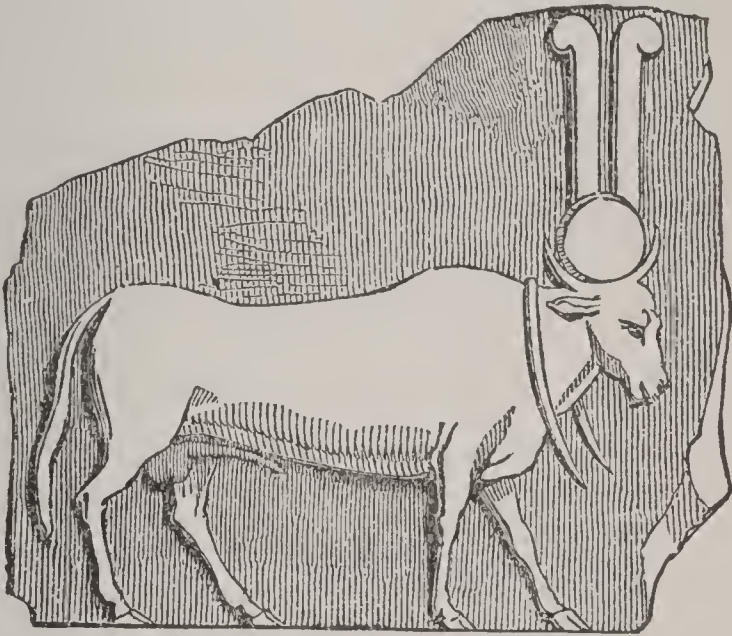
**APIOS TUBEROSA**, *ă'pî-ôs tû-bēr-ō'sa*: ground nut or wild bean (called *Glycine Apios* by Linnaeus): plant belonging to the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having tuberous roots, a twining stem, dark red flowers, leathery, two-valvular legumes, and pinnate leaves, with seven pair of smooth ovato-lanceolate leaflets. This plant, a native of N. Amer., has for a century been cultivated in botanic gardens in Europe, and has recently been brought into particular notice on the continent, largely through the French traveller Lamare-Picquot, who, during his travels in N. Amer., convinced himself of the value of the tubers as



## APIS.

an article of food, for which they are there used to some extent. Various attempts have since been made to cultivate it like the potato; but its cultivation is found difficult, because of the length and weakness of the twining shoots, and the length of the roots. The tubers cooked in steam are free from all acridity and bitterness, and very much resemble potatoes dressed in the same way. They contain more nitrogen than potatoes (4·5 per cent), also more starchy farina (33·55 according to an analysis by Payen).

APIS, n. *ā'pīs* [L. and Gr. *Apis*]: the sacred bull, worshipped with divine honors by the ancient Egyptians, who regarded it as a symbol of Osiris, the god of the Nile, the husband of Isis, and the great divinity of Egypt. A sacred court or yard was set apart for the residence of A. in the temple of Ptah at Memphis, where a numerous retinue of priests waited upon him, and sacrifices of red oxen were offered to him. His movements, choice of places, and changes of appetite, were religiously regarded as oracles.



Apis.—Golden Calf.

It was an understood law that A. must not live longer than 25 years. When he attained this age, he was secretly put to death, and buried by the priests in a sacred well, the popular belief being that he cast himself into the water. If, however, he died a natural death, his body was solemnly interred in the Temple of Serapis at Memphis, and bacchanalian festivals were held to celebrate the inauguration of a new bull as A. As soon as a suitable animal was found having the required marks—black color with a white square on the brow; the figure of an eagle on the back, and a knot in the shape of a cantharus under the tongue—he was led in triumphal procession to Nilopolis at the time of the new moon, where he remained 40 days, waited upon by nude women, and was afterwards conveyed in a splendid vessel to Memphis. His Theophany, or day of discovery, and his birthday, were celebrated as high festivals of seven days’

## APIS—A POCO A POCO.

duration during the rise of the Nile. The worship of the golden calf by the Israelites in the wilderness, and also the employment of golden calves as symbols of the Deity by Jeroboam, have been very generally referred to the Egyptian worship of Apis.

A'PIS, APIDÆ: see BEE.

AP'ISH, etc.: see under APE.

A'PIUM: see CELERY.

APLACENTALIA, n. plu. *ăp'lăs-ĕn-tă'ľĭ-ă* [Gr. *a*, without; Eng. *placenta*]: the section of the Mammalia, including the Didelphia and Monadelphias, in which the young is not furnished with a placenta. See PLACENTA.

APLANATIC, a. *ăp'lăn-ăt'ĭk* [Gr. *a*, without; *planăō*, I wander]: applied to a telescope or lens which entirely corrects the aberration of the rays of light.

APLOMB, n. *ă-plŏm'* or *ă-plŏng'* [F. *à plomb*, to the lead, perpendicular line—*lit.*, true to the plumb-line]: the self-possession which arises from perfect self-confidence; the settling down into its fit place as if it were naturally.

APNŒA, n. *ăp-nĕ'ă* [Gr. *a*, without; *pne'ō*, I breathe]: loss of breath; suffocation.

APO, *ăp'ō*: a Greek prefix signifying 'away'; 'from.'

APOCALYPSE, n. *ă-pŏk'ă-lĭps* [F.—from L. *apocalypsis*; Gr. *apokalypsis*, an uncovering—from Gr. *apo*, from; *kalup'to*, I cover, or conceal]: an uncovering of hidden things; a revelation; a vision; the last book of the New Testament. See REVELATION OF JOHN. APOCALYPTIC, n. *ă-pŏk'ă-lĭp'tĭk*, or APOC'ALYP'TICAL, a. *-tĭ-kăl*, pertaining to revelation. APOC'ALYP'TICALLY, ad. *-kăl-ľĭ*.

APOCALYP'TIC NUMBER: 'the mystical number' 666, spoken of Rev. xiii. 18. As early as the 2d c., the church had found that the name Antichrist was indicated by the Greek characters expressive of this number; while others believed it to express a date. Various interpretations have been suggested; but the mystery remains. One of the most probable interpretations is that which was current in the days of Irenæus, and which found the number in the word *Lateinos* (*Latinus*) applied to pagan Rome. The Roman nation—the mightiest pagan power on earth—was the most terrible symbol of Antichrist, and the number 666 appears in the Greek characters which spell the name. Many Protestant controversialists have supported their views by this interpretation, applying the prophecy to papal Rome; but this opinion of late finds fewer advocates among Protestant scholars.

APOCARPOUS, a. *ăp'ō-kăr'pŭs* [Gr. *apo*, from; *karpos*, fruit]: applied to fruits when their carpels are either quite separate or only partially united. A. FRUITS, in *bot.*, are those fruits which are the produce of a single flower, and are formed of only one carpel, or of a number of carpels remaining free and separate from each other.

A POCO A POCO, *ă pŏ'kŏ â pŏ'kŏ* [Ital.]: in Music, by degrees; by little and little.



## APOCOPE—APOCRYPHA.

**APOCOPE**, n. *ă-pők'ō-pē* [Gr. *apo*, from; *kopto*, I cut]: omission of the last letter or syllable of a word. **APOC'OPATED**, a. shortened by cutting off the last letter or syllable.

**APOCRENIC ACID**, *ă-po-krĕn'ĭk-*: one of the products of the natural decay of wood and other plant textures; found wherever lignine or woody fibre is decomposing in soils, etc. As A. A. is soluble in water, it follows that rain-water falling on and percolating through soils containing this substance, becomes impregnated with it; and hence, in many natural waters, A. A. is a recognized constituent. A. A. performs an important function in the growth of plants, as there is every reason to believe that it forms one of the stages through which matter travels from dead plants again into the living vegetable tissue.

**APOCRYPHA**, n. *ă-pők'rĭ-fă* [Gr. *apo*, from, or intensive; *krupto*, I hide]: things wholly kept back or concealed; certain disputed books received as parts of inspired Scripture by Rom. Catholics and others, but generally rejected by Protestants. **APOCRYPHAL**, a. *ă-pők'rĭ-făl*, doubtful; uncertain. **APOC'RYPHALLY**, ad. *-lĭ*. **APOC'RYPHALNESS**, n.

**APOC'RYPHA**, or **APOCRYPHAL WRITINGS**: originally meant *secret* or *concealed*, and was rendered current by the Jews of Alexandria. In the earliest churches, it was applied with very different significations to a variety of writings. Sometimes it was given to those whose authorship and original form were unknown; sometimes to writings containing a hidden meaning; sometimes to those whose public use was not thought advisable. In this last signification, it has been customary, since the time of Jerome, to apply the term to a number of writings which the Septuagint had circulated among the Christians, and which were sometimes considered as an appendage to the Old Testament, and sometimes as a portion of it. The Greek Church, at the Council of Laodicea (360), excluded them from the canon; the Latin Church, on the other hand, always highly favored them; and finally the Council of Trent (1545-63) placed them on an equality with the rest of the Old Testament. The Church of England uses them in part for edification, but not for the 'establishment of doctrine.' All other Protestant churches in England and America reject their use in public worship. But it was formerly customary to bind up the A. between the authorized versions of the Old and New Testaments, though this has now ceased, and, as a consequence, this curious, interesting, and instructive part of Jewish literature is now known to comparatively few besides scholars. The Old Testament A. consists of 14 books: 1. First Esdras (q.v.); 2. Second Esdras (q.v.); 3. Tobit (q.v.); 4. Judith (q.v.); 5. The parts of Esther not found in Hebrew or Chaldec; 6. The Wisdom of Solomon; 7. The Wisdom of Jesus, son of Sirach, or Ecclesiasticus (q.v.); 8. Baruch (q.v.); 9. The Song of the Three Holy Children; 10. The History of Susanna; 11. The History of the Destruction of Bel and the Dragon (q.v.); 12. The Prayer of Manasses,

King of Judah (see MANASSEH); 13. First Maccabees (q.v.); 14. Second Maccabees (q.v.). The precise origin of all of these writings cannot be ascertained. It is enough to state here that some bear traces of a Palestinian, others of an Egypto-Alexandrine, and others, again, of a Chaldaico-Persian origin or influence. Most, if not all, bear internal evidence of having been composed in B.C. 1st and 2d c.

The A. of the New Testament may be arranged under three heads: 1. The writings comprising the *Apocryphal Gospels*, which consist of 22 separate documents, 10 in Greek and 12 in Latin. They concern themselves with the history of Joseph and the Virgin Mary before the birth of Christ, with the infancy of Christ, and with the history of Pilate. The most important of the set are the *Protevangelium of James*, the *Gospel of Thomas*, and the *Acts of Pilate*, which are perhaps the *origines* of all the apocryphal traditions. That many of the stories found in these were current in the 2d c. is abundantly proved, but we have no evidence that any of the books known as Apocryphal Gospels were then in existence, or are older than the 4th c. 2. The *Apocryphal Acts of the Apostles*, consisting of 13 documents originally written in Greek, but found also in a Latin compilation probably of the 6th c. They are distinguished from the Apocryphal Gospels by having less of miracle and more of didactic discourse. The more important of the collection are *The Acts of Peter and Paul*, *The Acts of Barnabas*, *The Acts of Philip*, *The Acts of Andrew*, *The Acts of Bartholomew*, and *The Acts of John*. It is difficult to ascertain their age. Some are probably of earlier date than the Apocryphal Gospels, but the original MSS. are lost, and we have them only in late transcripts of the middle ages. 3. The *Apocryphal Apocalypses*, consisting of seven documents, four of which are called apocalypses by their authors. There is great and perplexing variety in the MSS. That called *The Apocalypse of Moses* relates rather to the Old Testament than to the New; so does *The Apocalypse of Esdras*, a weak imitation of the Fourth Book of Esdras. The others are *The Apocalypse of Paul*, *The Apocalypse of John*, and *The Assumption of Mary* in three forms. These, too, exist only in late MSS. of the middle ages, and it is, of course, not quite certain that they are the same in form as the works bearing the same name referred to in the writings of the Fathers. The New Testament A. throws a flood of light upon the workings of the early Christian consciousness, and enables us to see the superiority of the canonical Scriptures.—See Tischendorf's *Prolegomena* to the Apocryphal Literature of the New Testament (Leipsic, 1873); Clark's *Ante-Nicene Christian Library*, vol. 16 (Edinburgh, 1870); Baring-Gould, *Lost and Hostile Gospels* (1874); B. Harris Cowper, *The Apocryphal Gospels* (5th ed. 1881); and Canon Churton, *The Uncanonical and Apocryphal Scriptures* (1885).

APOCYNACEÆ, *ă-pŏs'ĭ-nă'sē-ē*, or APOCY'NEÆ: a natural order of Dicotyledonous plants consisting of trees and shrubs, generally with milky juice, having entire leaves, and no stipules. The calyx is usually 5-partite, persistent;



## APODA—APODIXIS.

the corolla hypogenous, monopetalous, often with scales in its throat, regular, 5-lobed, twisted in bud. There are five stamens, which are inserted on the corolla; the anthers adhere firmly to the stigma, to which the pollen is immediately applied; the anthers are 2-celled, and open longitudinally; the pollen is granular. The ovaries are two, each 1-celled; or one, 2-celled; ovules usually numerous; styles one or two; the stigma is contracted in the middle, and peculiarly characteristic of the order. The fruit is a follicle or capsule, or drupe or berry, double or single. The seeds have a fleshy or cartilaginous albumen, or (rarely) are ex-albuminous. There are about 566 known species, chiefly natives of tropical countries. The PERIWINKLE (q.v.) is its only representative in the flora of Britain, a wanderer, as it were, from the tropics, yet hardy enough for the climate with which it has to contend; the OLEANDER (q.v.) and a few others are found in the s. of Europe. Many species are poisonous; among which is the noted TANGHIN (q.v.) or TANGHEENA of Madagascar. Some are used in medicine, in India and other countries. A number of species yield CAOUTCHOUC (q.v.). The milk of others is bland and wholesome, as the HYA HYA or COW-TREE (q.v.) of Demerara. Some are used in dyeing; *Wrightia tinctoria* yields indigo of good quality. A number yield eatable fruits, as *Willughbeia edulis* and *Carissa Carandaa* in India; *Carissa edulis* in Arabia, and certain species of *Carpodinus*, called PISHAMIN in Sierra Leone, and *Hancornia*. *Apocynum cannabinum*, Indian hemp, a herbaceous plant about 4—5 ft. in height, with unbranched stem, oblong leaves, and lateral cymes of whitish bell shaped flowers, yields a very strong fibre, which the Indians of North America employ for making twine, cloth, fishing-nets, etc.

APODA, n. plu. *ăp'ô-dă* [Gr. *a*, without; *podes*, feet]: those fishes which have no ventral fins. APODAL, a. *ăp'ô-dăl*, destitute of feet; applied also to such fishes as the eel, sword-fish, wolf-fish, etc., which have no ventral fins. In the Linnæan system, the *Apodes* are an order of Fishes, in which genera not otherwise nearly allied are brought together; but in the systems of Cuvier and other recent naturalists, a less important place is assigned to this distinctive character. APODIA, n. *ăp-ô'di-ă*, the absence of feet.

APODEMA, n. plu. *ăp-ôd'ě-mă* [Gr. *apo*, from; *děma*, a cord, a bond; *demăta*, cords or bonds]: certain appendages on the bodies of Articulata giving attachment to muscles, or articulating with wings and the like. APODEMATA, n. plu. *ăp'ô-děm'ă tă*, certain chitinous septa which divide the tissues in the Crustacea.

APODICTIC, *ăp'ô-dik'tik*: a logical term signifying a judgment or conclusion which is necessarily true; or, in other words, a judgment of which the opposite is impossible. No. A. judgment can be founded on experience, because experience does not supply the idea of an absolute necessity.

APODIXIS, n. *ăp'ô-diks'is* [L. *apōdix'is*; Gr. *apodeix'is*, a setting forth—from Gr. *apo*, *deik'numi*, I show]: full

## APODOSIS—APOLLINARIS.

demonstration. **APODICTIC**, a. *ăp'ō-dīk'tīk*, or **AP'ODIC'TICAL**, a. *-tī-kāl*, evident beyond contradiction; clearly proving. **AP'ODIC'TICALLY**, ad. *-lī*.

**APODOSIS**, n. *ă-pōd'ō-sīs* [G. *apōdōsis*, conclusion—from *apo*, from; *didōmī*, I give]: in *gram.*, the consequent clause in a conditional sentence, expressing the result—the clause expressing the condition being called the *protasis*.

**APOGEE**, n. *ăp'ō-jē* [Gr. *apo*, from; *gē*, the earth] properly speaking, the greatest distance of the earth from any of the heavenly bodies. Its application, however, is restricted to the sun and moon, the sun's A. corresponding to the earth's aphelion, and the moon's A. being the point of its orbit most remote from the earth. A. is opposed to perigee. **APOGEAN**, a. *ăp'ō-jē'ăn*, pertaining to.

**APOLDA**, *ă-pōl'dā*: town of the grand duchy of Saxe-Weimar-Eisenach, Germany; on the Werlitz, a feeder of the Saale, 8 m. n.e. from Weimar. It is a station on the Thuringian railway, between Weimar and Weissenfels, and a place of much industrial activity, having extensive manufactures of hosiery. Pop. (1894) 20,880.

**APOLLINARIS**, *a-pōl-ī-nā'ris*, the Younger: Bishop of Laodicea in Syria (362); and one of the warmest opponents of Arianism. Both as a man and as a scholar, he was held in the greatest reverence; and his writings were extensively read in his own day. His father, A. the Elder, who was presbyter of Laodicea, was born at Alexander, and taught grammar, first at Berytus, and afterwards at Laodicea. When Julian prohibited the Christians from teaching the classics, the father and son endeavored to supply the loss by converting the Scriptures into a body of poetry, rhetoric, and philosophy. The Old Testament was selected as the subject for poetical compositions after the manner of Homer, Pindar, and the tragedians; while the New Testament formed the groundwork of dialogues in imitation of Plato. It is not ascertained what share the father had in this work, but as he had a reputation for poetry, he probably put the Old Testament into Greek verse. But it was chiefly as a controversial theologian, and as the founder of a sect, that A. the Younger is celebrated. He maintained the doctrine that the *logos*, or divine nature in Christ, took the place of the rational human soul or mind, and that the body of Christ was a spiritualized and glorified form of humanity. This doctrine was condemned by several synods, especially by the Council of Constantinople (381), on the ground that it denied the true human nature of Christ. The heresy styled Apollinarianism spread rapidly in Syria and the neighboring countries, and, after the death of A., divided itself into two sects—the Vitalians, named after Vitalis, Bp. of Antioch; and the Polemeans, who added to the doctrine of A. the assertion that the divine and human natures were so blended as one substance in Christ that his body was a proper object of adoration. On this account they were accused of *sarcolatria* (worship of the flesh) and *anthropolatria* (worship of man), and also were styled *synousiastai* (*syn*, together, and *ousia*, substance), because they confused to-



## APOLLINARIS WATER—APOLLO.

gether the two distinct substances. The whole controversy, which occupied a great part of the 5th c., is an instance of human reason wandering out of its proper sphere. A. must not be confounded with Claudius A., Bp. of Hie-rapolis, in Phrygia (170).

APOLLINARIS WA'TER, *â-pŏl-lī-nā'ris*: alkaline mineral water containing carbonate of soda, from the Apollinaris Spring, in the valley of the Ahr, in the Rhine province. It is largely imported into the United States.

APOLLO, n. *ă-pŏl'lō* [L. and Gr. *apŏllōn*]: a god of the anc. Greeks and Romans, worshipped under various names. A. may be regarded as the characteristic divinity of the Greeks, inasmuch as he was the impersonation of Greek life in its most beautiful and natural forms, and the ideal representative of the Grecian nation. His mild worship, with its many festivals, accompanied as they were by cessation from all hostilities; his various shrines at sacred places, with their oracles, and the general idea of his character, had a wide, powerful, and beneficent influence on social and political life throughout the states of Greece. Homer and Hesiod mention that he was the son of Zeus and Leto, but neither states where he was born. The Ephesians believed that both he and Diana, his sister, were born in a grove near their city. The Tegyræans of Bœotia, and the inhabitants of Zoster in Attica, also claimed the honor of his birth; while the Egyptians seemed to think he properly belonged to them; but the most popular legend was that which made him a native of Delos, one of the Cyclades, where his mother Leto, followed by the jealous wrath of Juno over land and sea, at length found rest and shelter, and was delivered of him, under the shadow of an olive-tree, at the foot of Mount Cynthus. To spite the Queen of Heaven, who was far from being a favorite with the other goddesses, these hastened to tender their services to the weak and wearied Leto. The young A. was the object of great regard and care. Themis fed him with nectar and ambrosia, the food of the gods, which seems to have suddenly excited the conceit of the infant deity, inasmuch as he surprised his nurse by starting to his feet, demanding a lyre, and announcing his intention to reveal the will of Jove.

In ancient literature A. is described as possessed of many and various powers, all of which, however, are seen on closer inspection to be intimately related to each other. He is spoken of: 1. As the god of retributive justice, who, armed with bow and arrows, sends down his glittering shafts upon insolent offenders. In this character he appears in the opening of the *Iliad*. 2. As the instructor of bards, and the god of song or minstrelsy, playing upon the phorminx, or seven-stringed lyre, and singing for the diversion of the other deities when engaged in feasting. 3. As the god of prophetic inspiration, especially in his oracle at Delphi. 4. As the guardian deity of herds and flocks. 5. As the god of medicine, who affords help, and wards off evil. In this sense he is represented as the father of Asclepius (*Æsculapius*), the god of the healing art. 6. As a founder of cities. According to Homer, he assisted Neptune in

## APOLLO BELVEDERE.

building the walls of Troy. Cyrene, Naxos in Sicily, and other cities, venerated A as their founder. By



Apollo.

the later writers, A. was identified with Helios, the sun-god, though Homer describes the latter as a distinct deity. Several critics, however, have regarded Helios, or the sun-god, as the true original A.—an opinion which may be supported by many probabilities. The supposition that A. was identical with the Egyptian deity Horus was rejected by the learned O. Müller, who generally opposed all attempts to deduce Grecian from Egyptian mythology. According to Müller's theory, A. was a purely Doric deity, whose first residence was in Tempe, and who afterwards removed to Delphi, whence the fame of his oracle was spread abroad, and made him to be recognized as the na-

tional divinity of Greece. The introduction of his worship into Attica appears to have been contemporaneous with the immigration of the Ionians, and that worship seems to have spread over the Peloponnesus, immediately after it was conquered by the Dorians. Much controversy has taken place, both with reference to the idea which lies at the root of the whole myth of the A. worship, and also as to whether this myth had its origin in the north of Greece or in Egypt. Even on the supposition that the original conception was derived from the latter source, it was to Greek art and philosophy that it owed its development into the ideal of humanity. The most celebrated oracles of A. were at Delphi, Abæ in Phocis, Ismenion in Thebes, Delos, Claros, near Colophon, and Patara in Lycia. Among the Romans, the worship of A. was practiced as early as B.C. 430, and prevailed especially under the emperors. But there can be no doubt that the Romans derived their conceptions of A. entirely from the Greeks. It was in honor of A. and his sister Diana that the *ludi sæculares* were celebrated every hundred years. The attributes of A. are the bow and quiver, the cithara and plectrum, the snake, shepherd's crook, tripod, laurel, raven, etc.; less frequently, the grasshopper, cock, hawk, wolf, and olive-tree. In sculpture, he is generally represented with a face beautifully oval, high forehead, flowing hair, and slender figure.

APOLLO BELVEDERE, *ä-pöl' lō bēl' ve-dēr'*: a celebrated statue of antiquity, generally regarded as embodying the highest ideal of manly beauty. It is usually supposed to represent the 'lord of the unerring bow' in the moment of his victory over the Python, but numerous other explanations have been suggested. The figure (upwards of 7 feet in height) is naked, but a cloak fastened round the neck hangs gracefully over the extended left arm; the expression of the face is one of calm and godlike triumph, mixed with 'beautiful disdain.' This great work of art was discovered in 1503,



## APOLLODORUS—APOLLONIUS.

amid the ruins of the ancient Antium, now Capo d'Anzo, and purchased by Pope Julius II., who placed it in the Bel-



Apollo Belvedere.

vedere of the Vatican, whence the name it bears. The date of its execution is with probability referred to the reign of Nero, but the name of the artist is a matter of mere conjecture. The left hand and the right fore-arm, wanting in the statue as discovered, were restored by G. A. da Montorsoli, a pupil of Michael Angelo.

**APOLLODORUS**, *a-pŏl-ō-dō'rŭs*: lived abt. B.C. 408: Athenian painter, predecessor of Zeuxis. He introduced improved coloring and distribution of light and shade.

**APOLLODORUS**: Greek grammarian, lived about B.C. 140, studied philosophy in Athens, and grammar under Aristarchus; wrote a work on mythology, giving an arrangement of old myths from the earliest times to the historical period; also a geography, a chronicle in iambic verse, and several grammatical works. The mythology, which begins with the origin of the gods, probably went down as far as the Trojan cycle, but a portion of it has perished. It has been reckoned by some only an extract from a larger work by A., though this is mere hypothesis. An edition of the *Bibliotheca* of A. was published 1783, by Heyne, and one by Hercher 1874.

**APOLLODORUS**: celebrated architect in the time of the emperor Trajan, by whom he was employed to construct a bridge over the Danube in Lower Hungary. His severe censure, boldly pronounced on a design for a temple of Venus, which the emperor Hadrian had sent to him, caused A. to be sentenced to death, A.D. 129.

**APOLLONIUS**, *ăp ŏl-lŏ'nŭ-ŭs*, surnamed **DYSKOLOS** (or ill-tempered), of Alexandria: Greek grammarian, 2d c. Some of his grammatical works were edited by Bekker. A. was the first who reduced grammar to a system. His repu-

## APOLLONIUS.

tation was so high, that Priscian calls him *grammaticorum princeps* (prince of grammarians).

APOLLONIUS, son of Archebulus of Alexandria: lived in the time of Augustus; author of a lexicon of Homeric words.

APOLLONIUS, surnamed Molon: teacher of rhetoric at Rhodes, and also gave lectures at Rome, where he was highly esteemed by Cicero and Cæsar.

APOLLONIUS OF PERGA: B.C. 240; is classed with Euclid, Archimedes, and Diophantus, as one of the founders of the mathematical sciences. His work on conic sections has been preserved, partly in the original Greek, partly in an Arabic translation.

APOLLONIUS OF RHODES (or of Alexandria, say some authorities): b. B.C. 235; wrote many works on grammar, and an epic poem, entitled the *Argonautica*, marked rather by learning and industry than by poetical genius, though it contains some truly artistic passages, such as those exhibiting the growth of Medea's love. It was greatly admired by the Romans, was translated into Latin by Publius Terentius Varro, and was imitated, not only in a wholesale manner by Valerius Flaccus, but even by Virgil in some passages. It has been edited by the German scholars Brunck and Wel-lauer (1813-28), and by Keil (1853-54).

APOLLONIUS, OF TY'ANA, in Cappadocia: lived in the time of Christ; a zealous follower of the doctrines of Pythagoras. He soon collected a considerable number of disciples, travelled through a great part of Asia Minor, and endeavored to find his way to India, in order to become acquainted with the doctrine of the Brahmins. On this journey he stayed for a time in Babylon, was introduced to the Magi, and at last reached the court of King Phraortes, in India, who recommended him to Jarchas, the principal Brahmin. When A. returned from this pilgrimage, his fame as a wise man was greatly increased; the people regarded him as a worker of miracles and a divine being, and princes were glad to entertain him at their courts. He himself seems to have claimed insight into futurity, rather than the power of working miracles. From Rome he was expelled on a charge of having raised a young woman from the dead. After extensive travels in Spain, Italy, Greece, and Ethiopia, he was accused of having taken part in an insurrection against Domitian; but appeared before the tribunal, and was acquitted. Ultimately, he appears to have settled in Ephesus, where he opened a Pythagorean school, and continued his teaching until he died, nearly one hundred years old. His history was written about a hundred years after his death by Philostratus (q.v.). It contains a mass of absurdities and fables, through which an outline of historical facts and the real character of the man are sufficiently discernible. Hierocles, a heathen statesman and opponent of Christianity, wrote, in the 3d c., a work on the life and doctrines of A., with a view to prove their superiority to the doctrine of Christ. In modern times, the notorious English freethinker Blount, and Voltaire in France, have renewed the attempt.



## APOLLONIUS—APOLOGY.

**APOLLONIUS OF TYRE:** hero of a Greek romance, which enjoyed great popularity in the middle ages, and was translated into almost all the languages of Western Europe. In it are related the romantic adventures which befell A., a Syrian prince, previous to his marriage with the daughter of King Alcistrates, of Cyrene. To these are added the adventures of his wife, who was parted from him by apparent death, as well as those of his daughter, Tarsia, who was carried off by pirates, and sold in Mitylene. The poem closes with the reunion of the whole family. The original Greek work no longer exists; but there are three very early Latin versions, of which one was published by Welser (Augsburg, 1595); another is to be found in the *Gesta Romanorum*; and the third in the *Pantheon* of Gottfried of Viterbo. From this Latin source have proceeded the Spanish version of the 13th c., printed in Sanchez' *Collecion de Poesias Castellanas* (2d edition, Paris, 1842), several French versions, in prose and verse, as well as several Italian. As early as the 11th c. there was an Anglo-Saxon adaptation of the work, and subsequently various English ones appeared. Shakespeare has treated the subject in his drama of *Pericles*; he substantially follows Gower, in his *Confessio Amantis*, who bases his narrative on the *Pantheon* of Gottfried of Viterbo. Three popular English stories, drawn from a French version of this romance, appeared in London, 1510, 1576, and 1607; while the Dutch, 1493, derived theirs from the German. The romance was rendered into German, probably from the *Gesta Romanorum*, by a certain 'Heinrich von der Neuenstadt' (i.e., Vienna), about 1300, in the form of a long, and as yet unpublished poem. Later we have a *Histori des Küniges Appolonii*, translated from Gottfried of Viterbo; first published at Augsburg, 1476. Simrock, in his *Sources of Shakspeare*, narrates the story as it is given in the *Gesta Romanorum*. A modern Greek translation of the Latin romance, undertaken in 1500 by Gabriel Contianus, of Crete, and several times reprinted at Venice, must not be confounded with the lost Greek original.

**APOLLYON**, n. *ă-pŏl'ŭ-ŏn* or *-yŏn* [Gr. *apol'luō*, I destroy]: a name used in the Revelation of St. John to designate the destroying angel of the bottomless pit.

**APOLOGUE**, n. *ăp'ŏ-lŏg* [F. *apologue*—from Gr. *apolŏgōs*, a fable]: a fable, parable, or short story, intended to serve as a pleasant vehicle of some moral doctrine. One of the oldest and best apologues or parables is that by Jotham, Judges. ix. 7-15. Another celebrated A. is that of the 'Limbs and the Body,' related by the patrician Menenius Agrippa. Æsop's fables are apologues that have a world-wide reputation. Luther held such an opinion of the value of the A. as a vehicle of moral truth, that he edited a revised Æsop, especially for young people, for which he wrote a characteristic preface.

**APOLOGY**, n. *ă-pŏl'ŏ-jŭ*, **APOLOGIES**, plu. *-ŏ-jŭz* [Gr. *apolog'ŭā*, apology—from *apo*, from; *logos*, speech: F. *apologie*, apology]: a speech in defense or excuse; an excuse; a defense. **APOLOGETIC**, a. *ă-pŏl'ŏ-jĕt'ik*, or **APOL'OGET'**

## APOLOGY.

ICAL, a. -jět'î-kāl, excusing; defending by words. APOL'OGET'ICALLY, ad. -lî. APOLOGETICS, n. plu. ā-pōl'ō-jět'îks, that branch of theology which defends the Scriptures, and sets forth the evidence of their divine authority. APOLOGIST, n. ā-pōl'ō-jîst, or APOL'OGIZ'ER, n. -jîz'ér, one who makes an apology, or writes in defense of another. APOLOGIZE, v. ā-pōl'ō-jîz', to make an excuse for; to speak in defense of. APOL'OGIZ'ING, imp. APOL'OGIZED', pp. -jîzd'.—SYN. of 'apology': defense; justification; exculpation; excuse; plea.

APOLO'OGY: the term is now commonly understood as synonymous with an excuse for defect, mistake, misdeed, breach of an engagement, etc., but was originally used as the title of any work written in defense of certain doctrines, as in the *A. of Socrates*, ascribed to Plato and Xenophon; the *A. for the Christians*, by Tertullian, and in many other defenses of the Christians, written by Justin Martyr, Athenagoras, Tatian, Theophilus, Origen, Eusebius, Minucius Felix, Arnobius, Lactantius, Augustine, Orosius, and others. The *A.* in some cases became rather a polemic. The attacks parried or retorted in these apologetical works are such as charges of atheism, want of philosophical knowledge, anti-social tenets, etc. Both the charges and the refutations brought forward serve to give us an insight into the character of the times when these works were written. Thus, in the *A.* by Tertullian, it is curious to find a formal argument employed to refute the assertion that the spread of Christianity was the cause of 'earthquakes' and other natural phenomena which had occurred in some parts of the Roman empire. After the 4th c., when the church was made dominant under the Roman emperors, apologetical writings were less called for; but Bartholus Edessenus and Raymundus Martinus wrote against the Jews and the Mohammedans. In the 15th c., when the revival of learning placed Christianity in apparent opposition to the Platonic philosophy, Marsilius Ficinus wrote in defense of revelation; and some time after the Reformation, the spread of freethinking, and skepticism in England was opposed by a variety of apologetical works, chiefly maintaining the points that Christianity is a divine revelation, Christ a divine messenger, and his church a divine institution. The defense of Christianity on grounds of reason came now to be treated as a distinct branch of theology, under the name of *Apologetics*. Among the numerous apologetic works by Protestants, are those by Grotius (*De Veritate*, etc.), Butler (*Analogy of Religion, Natural and Revealed*), Lardner (*Credibility of the Gospel History*), Leland, Addison, Soame Jenyns (*Internal Evidences of the Christian Religion*), Hugh Farmer, Bishop Watson (*A. for Christianity*), Paley (*Evidences of Christianity*, and *Horæ Paulinæ*), Chalmers, the Bampton Lectures (q.v.), etc. Among the Rom. Cath. writers, the most eminent are Pascal, Houtteville, Guenée, Bergier, Mayr, and Chateaubriand.

Recently, a great number of apologetic works by Neander, Tholuck, and others have appeared, in reply to Strauss's *Life of Jesus*, and the *Vie de Jésus* by Ernest Renan.



## APOMORPHINE—APOPLEXY.

**APOMORPHINE**, n. *ăp'ô-môr'fîn* [Gr. *apo*, from; Eng. *morphine*]: a valuable and powerful emetic obtained from morphine by heating with hydrochloric acid.

**APON**: see **AMBOYNA**.

**APONEUROSIS**, n. *ăp'ôn'û-rô'sîs*, **APON'EURO'SES**, plu. *-rô'sêz* [Gr. *aponeuro'sis*, the end of a muscle—from *apo*, from; *neuron*, a nerve, a muscle]: the extremity of a muscle where it becomes a tendon; the fibrous sheath of a muscle, or investment of a part. For the sake of convenience, **A.** in Anatomy is generally confined to expansions from the tendons of muscles, as the lumbar **A.** If a tendon is very broad and expanded, as that of the external oblique muscle of the abdomen, it is said to be aponeurotic. Some muscles, as those on the shoulder-blade, are partially covered with a tendinous expansion, to which some of their fibres are attached; this is termed the aponeurotic *origin* of the muscle; it gives the muscle a more extensive attachment without adding materially to weight. Aponeuroses stretch in some localities as protections over large arteries; thus, in bleeding from the vein nearest the inside of the bend of the elbow, the only structure between it, the lancet, and the brachial artery, is an aponeurotic expansion from the biceps tendon into the muscles of the forearm. See **FASCIA**.

**APOPETALOUS**, a. *ăp'ô-pêt'ă-lûs* [Gr. *apo*, from; *pětălon*, a petal]: in *bot.*, applied to corollas whose petals are perfectly distinct and disconnected; the opposite of *gamopetalous*.

**APOPTHEGM** or **APOTHEGM**, n. *ăp'ô-thêm*: see **APOTHEGM**.

**APOPHYLOUS**, a. *ă-pŏf'îl-ûs* [Gr. *apo*, from; *phullon*, a leaf]: in *bot.*, applied to perianths whose parts are distinct and separate.

**APOPHYSIS**, n. *ă-pŏf'î-sîs* [Gr. *apo*, from; *phuo*, I grow]: in *anat.*, a process or protuberance on the surface of a bone; in *bot.*, any irregular swelling on the surface; a tubercle at the base of the seed vessel of certain mosses.

**APOPLEXY**, n. *ăp'ô-plêk-sî* [Gr. *apoplex'îă*, stupor—from *apo*, from; *plessô*. I strike]: a disease or an affection of the brain that causes stupor; a fit in which all sensation and power of movement are suspended. **APOPLECTIC**, a. *ăp'ô-plêk'tîk*, or **AP'OPLEC'TICAL**, *tî-kăl*, pertaining to the disease of apoplexy. **APOPLEX**, n. *ăp'ô-plêks*, for **APOPLEXY**.

**APOPLEXY**: an engorgement of blood, with or without extravasation, in or upon any organ, as the brain (*cerebral A.*), the *spinal* cord or lungs (*pulmonary A.*). As popularly used, the term denotes vaguely a condition arising from some disturbance within the head. **A.** occurs in *fits*, which may be sudden or come on by degrees. They are characterized by loss of sense and motion, speechlessness and heavy sleep, with stertorous respiration and a slow pulse. The fit may last from a few hours to two or three days, and passes off, leaving generally more or less paralysis, and recurs at intervals of months or years. The *age* at which



**Apollo**, from a bas-relief at Rome.



**Long armed Ape** (*Hylobates Camboja*).



**Aoudad** (*Ammotragus tragelaphus*).



**Sand-eel** (*Ammbaytestobianus*), one of the **Apoda**.



**Apocarpous**  
**Fruit of Aconite.**



**Branch of Apple** with young Fruit; *a*, piece of the blossom.



## APOSEPALOUS—APOSTATE.

**A.** occurs most commonly is from fifty to seventy, and is comparatively rare before and after these ages. Cerebral **A.** may arise from mere congestion of the blood-vessels of the brain, caused by impeded return of the venous blood, as from the military stock, worn in some armies, pressing on the jugular veins, keeping the head long in one position, or turning it quickly. Stout persons, with short necks, are more liable to this form of **A.**; though lean persons are also frequently its victims. But in addition to congestion, there may be an escape of the watery portion of the blood from the congested vessels, and this collecting, produces *serous A.*; or, owing to a diseased condition of the arterial walls, the vessels may burst, and **A.** from cerebral hemorrhage be the result; the latter is the most common, and is usually preceded by some softening of the brain substance itself. If this bleeding be to any great extent, death results; if only a small quantity escapes, it coagulates, and forms a clot which is absorbed in time. Persons with diseased heart and lungs, and pregnant females, are liable to apoplectic fits. The attack is generally preceded by vertigo, headache, partial or temporary loss of memory, and occasionally double vision. When these warnings occur, medical advice should be sought to correct the digestive functions; and by relieving the oppressed brain, ward off the fit. When the latter occurs, the patient's head should be raised, cold applied, and in some cases blood should be withdrawn from the temporal artery or external jugular vein. As soon as possible, purgative medicines should be administered. For the results of **A.**, see **PARALYSIS**. Tumors within the skull produce symptoms of **A.**

**APOSEPALOUS**, a. *ăp'ō-sĕp'ăl-ŭs* [Gr. *apo*, from, and *sepalous*]: in *bot.*, consisting of distinct and separate sepals or calyx leaves.

**APOSIOPESIS**, n. *ă-pŏs'ĭ-ŏ-pĕ'sĭs* [Gr. and L. *apos'ĭō-pĕsis*—from Gr. *apo*, from; *sĭōpa'ō*, I am silent]: a rhetorical device by which, for emphasis, modesty, or any other effect, a speaker abruptly breaks off.

**APOSTASIS**, n. *ă-pŏs'tă-sĭs* [Gr. *apŏstăsis*, distance from, an interval—from *apo*, from; *stăsis*, a standing]: in *bot.*, the separation of the whorls of leaves, or floral coverings, by an unusual length of the internodes.

**APOSTASY**, n., or **APOSTACY**, n. *ă-pŏs'tă-sĭ* [L. and Gr. *apostăsis'ă*, a standing off from—from *apo*, from; *stăsis*, a placing, a standing]: a departure from a former profession or belief. **APOSTATE**, n. *ă-pŏs'tăt*, one who forsakes his former principles or party—usually in a bad sense: **ADJ.** false; traitorous. **APOSTAT'ICAL**, a. *-tăt'ĭ-kăl*, after the manner of an apostate. **APOSTATIZE**, v. *ă-pŏs'tă-tĭz*, to forsake a former profession or belief. **APOS'TATIZ'ING**, imp. **APOS'TATIZED**, pp. *-tĭzd*.

**APOSTATE**, *ă-pŏs'tăt*: applied especially to one who changes his religion, and, by custom, always in a condemnatory sense, as equivalent to renegade, or one who changes his creed from unworthy motives. In early Christian times, the word was applied to those who abandoned their faith in

## APOSTEME—APOSTLE.

order to escape from persecution; but it was applied also to such as rejected Christianity on speculative grounds (the emperor Julian, for instance). After the 5th c., when heathenism was declining, many who had no sincere belief in Christianity, yet made profession of it, and were baptized: these also were styled apostates. The apostates in times of persecution were styled variously *Sacrificati*, *Thurificati*, etc., according to the modes in which they publicly made known their return to heathenism, by offering sacrifices or incense to the gods of Rome. The Rom. Cath. Church at one period imposed severe penalties on apostasy. The A. was of course excommunicated; sometimes also his property was confiscated, and he himself banished, or even put to death. It has often been of great moment to the fortunes of a nation that a prince has apostatized. The most renowned instance in modern history is that of Henry IV. of France. In 1833, there was published, at Erlangen, *A Gallery of Important Persons who in the 16th, 17th, and 18th Centuries went over from the Protestant to the Roman Catholic Church*.—The term APOSTASY is now employed commonly, and often abusively, as a reproach for great or sudden changes in political opinions.

**APOSTEME**, n. *ăp'ôs-tēm* [OF. *apostume*—from L. and Gr. *apōstēma*, an abscess]: a swelling filled with purulent matter; an abscess: the incorrect spellings, IMPOSTHUME and IMPOSTUME, are commonly used.

**A POSTERIORI**, a. *ăp'ôs-tē'rī-ōr'ī* [L. *a*, from; *postērior*, after, latter]: arguments in reasoning drawn from consequences, effects, or results. See A PRIORI.

**APOSTILL** or **APOSTIL**, n. *ă-pōs'til* [F. *apostille*, a postscript—from mid. L. *a*, to; *postilla*, notes added to references: the abbreviation of L. *post illa verba auctōris*, after those words of the writer]: a marginal note on a letter or other written document; a postscript.

**APOSTLE**, n. *ă-pōs'sl* [Gr. *apōstōlos*, one sent out or forth—from *apo*, away; *stello*, I send]: one sent out by another; a person sent to perform important business; one of the apostles, the immediate followers of Christ. **APOS'TLESHIP**, n. the office or dignity of an apostle. **APOSTOLIC**, a. *ăp'ôs-tōl'ik*, or **AP'OSTOL'ICAL**, a. *-ī-kāl*, relating to the apostles or to the office of an apostle. **AP'OSTOL'ICALLY**, ad. *-lī*. **AP'OSTOL'ICALNESS**, n. **APOSTOLATE**, n. *ă-pōs'tō-lāt*, a mission, the dignity or office of an apostle. **APOSTOLICITY**, n. *ă-pōs'tō-līs'ī-tī*, the state or quality of being apostolical. **APOSTOLIC FATHERS**, the early Christian writers, generally of the first century—commonly restricted to Polycarp, Clement, Ignatius, Hermas, and Barnabas. **APOSTOLIC SEE**, a title applied to the government of the pope of Rome in reference to his claim of being the successor of St. Peter. See APOSTOLIC SUCCESSION: ETC.

**APOSTLE**: any messenger whatever, but especially used to denote the twelve disciples whom Jesus sent forth to preach the gospel. Their names were Simon Peter, Andrew, John (the son of Zebedee), James (his brother), Philip, Bartholomew (called also Nathaniel), Thomas, Matthew (sur



## APOSTLES' CREED.

named Levi), James (the son of Alphæus), Thaddeus, Simon, and Judas Iscariot. Subsequently, Matthias was chosen in the room of Judas; and at a still later period, the number of the apostles was further increased by the calling of Paul to the apostleship. The term is sometimes used in the New Testament in its more general signification; thus Barnabas is styled an A. (Acts xiv.). It is a point of controversy between the supporters and opponents of episcopacy, whether or not the term A., as indicating an office, is applied to any except the original twelve, Matthias, and Paul; it being maintained, on the one hand, that the office is perpetuated in bishops; on the other, that it was temporary and belonged exclusively to those who were witnesses to the resurrection of Christ, and were employed by him to found the Christian Church. The apostles were twice commissioned by their Master to go forth on their work of evangelization. First, during the third year of his public ministry. On this occasion, their labors were to be restricted to the Jews, properly so called. Not even the Samaritans, though natives of Palestine, were to be the objects of their religious solicitude. They were earnestly to seek out the lost sheep of the house of Israel. The second time was shortly before the Lord's ascension, when their sphere of labor was indefinitely extended: 'Go ye therefore, and make disciples of all the nations, baptizing them in the name of the Father and of the Son and of the Holy Ghost' (Matt. xxviii. 19, 20). On the day of Pentecost, the apostles received miraculous gifts fitting them for their arduous work. And after evangelizing for some years in Palestine, they all departed, with the exception of James, into various quarters of the globe; but the region of their ministry seems to have principally comprised the civilized provinces and cities of the eastern part of the Roman empire—viz., Syria, Asia Minor, and Greece; though probably Peter, and after him Paul, visited Rome. There is no historical foundation for the tradition that the first apostles divided the then known world into twelve parts, each taking one of these for his special sphere of labor. This figment was very likely originated by two circumstances: 1. That the disciples were commanded to go into all the world and preach the gospel; and 2. That the disciples in point of fact had little personal intercourse with each other. Their zeal for the propagation of Christianity left them no time to gratify their social inclinations. As a consequence, we have very imperfect accounts of their lives or manner of death.

The several apostles are usually represented in mediæval pictures with special badges or attributes: St. Peter, with the keys; St. Paul, with a sword; St. Andrew, with a cross; St. James the Less, with a fuller's pole; St. John, with a cup and a winged serpent flying out of it; St. Bartholomew, with a knife; St. Philip, with a long staff, whose upper end is formed into a cross; St. Thomas, with a lance; St. Matthew, with a hatchet; St. Matthias, with a battle-axe; St. James the Greater, with a pilgrim's staff and a gourd-bottle; St. Simon, with a saw; and St. Jude, with a club.

**APOSTLES' CREED:** see CREED.

## APOSTOLIC—APOSTOLIC BRETHREN.

**APOSTOLIC**, or **APOSTOLICAL**: general term applied to everything derived directly from, or bearing the character of the apostles. Either case constitutes apostolicity. The Rom. Cath. Church declares itself the A. Church; the papal chair the A. chair, on the ground of an unbroken series of Roman bishops, from the chief apostle, Peter. The Church of England, in virtue of regular episcopal ordination from the pre-reformation church, claims to be A.; so likewise do the Protestant Episcopal Churches in Scotland and the United States. Apostolic Tradition (see **TRADITION**) claims to have been handed down from the apostles. In the same special sense, the name of A. Council belongs to that conclave of the apostles at Jerusalem (Acts xv.), about 51 or 52, occasioned by the disputes raised at Antioch by Judaizing Christians as to the admission of uncircumcised Gentiles into the church. Certain congregations or churches, also, which were the special scenes of the labors of the apostles, bore for centuries the title of A. Churches, more especially those of Jerusalem, Antioch, Ephesus, Corinth, and Rome. But with the ever-increasing spiritual power of the Roman hierarchy, the name A. came to be more and more exclusively applied to Rome, and is retained by her, despite the energetic protests of the Protestant Churches. Hence the term Apostolic See, i.e., the see of Rome; Apostolic Blessing, the blessing of the pope as the successor of St. Peter; Apostolic Vicar, the cardinal who represents the pope in extraordinary missions; Apostolic Chamber, a council intrusted with the care of the revenues of the see of Rome; Apostolic Months—January, March, May, July, September, November—the months in which the pope, according to the Vienna Concordat of 1448, took possession of the vacant benefices in Germany, etc. A papal brief or letter is styled A. in the same sense.

**APOSTOLIC BRETHREN**, or **APOSTOLICI**: the name given in Italy, towards the end of the 13th c., to one of those sects which, animated by the spirit of an Arnold of Brescia, felt constrained to oppose the worldly tendencies of the church. Its founder was Gerardo Segarelli, a weaver in Parma. Rejected, from some cause or other, by the Franciscan order, his long-continued and enthusiastic meditations led him to the profound conviction that it was above all things necessary to return to the simple forms of apostolic life. Accordingly, he went about (1260) in the garb of the apostles, as a preacher of repentance, and by his practical discourses gathered many adherents into a kind of free society, bound by no oaths. At first he managed to avoid any direct collision with the dogmas of the church; but after twenty years of undisturbed activity and growing influence, Segarelli was arrested by the Bp. of Parma; and in 1286, upon the occasion of his release, Pope Honorius IV. renewed a decree of Pope Gregory X. against all religious communities not directly sanctioned by the papal chair. In 1290, Nicholas IV. setting himself expressly to oppose the A. B., they, on their side, began avowedly to denounce the papacy, and its corrupt and worldly church, as the Babylon of the Apocalypse. In 1300, many, both men and women, and



## APOSTOLIC CANONS—APOSTOLIC FATHERS.

among them Segarelli, as having, after abjuration, relapsed into heresy, perished at the stake. But his cause survived him. Dolcino, a more energetic and cultivated man, brought up as a priest, who had previously been active in the Tyrol against the corruptions of the church, now headed the orphan sect in Italy. He taught the duty of a complete renunciation of all worldly ties, of property and settled abode, etc. Having retreated into Dalmatia, he announced thence the dawning of a new era, and in 1304, reappeared in Upper Italy, with thousands of adherents, as the enemy of the papacy—at that time humbled and impoverished by France. In 1305, a crusade was preached against him. He fortified the mountain Zebello, in the diocese of Vercelli, but was, after a gallant defense, compelled by famine to submit. After horrible tortures, which he bore with the utmost fortitude, he was burned. In Lombardy and the s. of France, remnants of the A. B. lingered on till 1368. See Krone, *Fra Dolcino und die Patarener*. (Leipsic, 1844.)

**APOSTOLIC CANONS AND CONSTITUTIONS:** both ascribed by tradition to Clemens Romanus; notes of ecclesiastical customs held to be apostolical, written in the form of apostolic precepts. The *Constitutiones Apostolicæ*, eight books, were composed probably in Syria, and contain, in the first six books, a comprehensive rule for the whole of Christian life. These were probably written about the end of the 3d c.; but the seventh book, essentially an abridgment of them, may have belonged to the beginning of the 4th c. The eighth book was put together in the middle of the 4th c., for the use of the priests, and relates only to the sacred offices. Interpolations, however, were afterwards introduced. The *Canones Apostolici*, also recognized by the church, were composed later. The first fifty, compiled in the middle of the 5th c., and translated from Greek into Latin by Dionysius the Younger, were acknowledged by the Latin Church alone. The Greek Church, on the other hand, accepted the thirty-five canons put forth in the beginning of the 6th c.; and this became a point of discord between the churches. Both collections were probably looked upon at first as apostolic traditions merely. Later, it came to be believed that they were written down by the apostles themselves, it being thought probable that they should have expressed themselves positively about the constitution as well as the dogmas of the church.

**APOSTOLIC CATHOLICS:** see IRVINGITES.

**APOSTOLIC FATHERS:** the immediate disciples and fellow-laborers of the apostles; and in a more restricted sense, those among them who have left writings. The A. F., specially so called, are Barnabas, Clement of Rome, Ignatius of Antioch, and Polycarp of Smyrna. It is uncertain whether Papias of Hierapolis, and the author of the *Shepherd*, were really disciples of the apostles. The writings of the A. F., as to their form and subject, may be looked upon as a continuation of the apostolic epistles, though far inferior to them in spirit. Their main purpose is to exhort to faith and holiness before Christ's coming again.—Editions of the

## APOSTOLIC MAJESTY—APOSTROPHE.

A. F. were published by Cotelarius (Par. 1672), Jacobson (Oxford 1838), Hefele (1839), and Dressel (1857); another by Zahn, Gebhardt, and others began to appear in 1875. There are several English translations, including one in Dr. Donaldson's *Ante-Nicene Library*, vol. i. (1867).

**APOSTOLIC MAJESTY:** a title held by the kings of Hungary, conferred by Pope Sylvester II., A. D. 1000, upon Duke Stephen of Hungary, who had not only much encouraged the progress of Christianity in Hungary, but actually preached himself, in imitation of the apostles. In 1758, the title was renewed by Pope Clement XIII., in favor of Maria Theresa as queen of Hungary, and continues to be used by the emperor of Austria as king of Hungary.

**APOSTOLIC PARTY:** a party conspicuous in the modern history of Spain; composed of fanatical Catholics, who were also absolutists so far as the king consented to be their instrument. They formed themselves (soon after the revolution of 1819) into the A. P., whose leaders were fugitive priests, and whose troops were smugglers and robbers. After being active in all the subsequent agitations, they finally merged (1830) in the Carlist party.

**APOSTOLIC SUCCESSION:** common phrase used to denote one or both of *two* things—the derivation of holy orders by an unbroken chain of transmission from the apostles, and the succession of a ministry so ordained to the powers and privileges of the apostles. The former is necessarily a matter of fact, to be ascertained by history; the latter is rather a matter of opinion—the Roman and Protestant Churches, and again individuals and parties in either, differing widely from each other in their views. See **BISHOP: ORDINATION**.

**APOSTROPHE**, n. *ă-pŏs'trŏ-fē* [Gr. *apostrophē*, a turning away—from *apo*, away; *stropho*, I turn—*lit.*, a turning away from the subject]: a sudden breaking off a subject, and addressing a present, an absent, or an imaginary being; a mark (') put in a word to show the omission of a letter or letters, or merely as the sign of the possessive case in nouns.

**APOSTROPHIC**, a. *ăp'ŏ-strŏf'ik*, pertaining to an apostrophe. **AP'OSTROPH'ICALLY**, ad. *-lī*. **APOSTROPHIZE**, v. *ă-pŏs'trŏ-fīz*, while speaking, to turn aside and address formally any one present or absent. **APOS'TROPHIZ'ING**, imp. **APOS'TROPHIZED**, pp. *-fīzd*.

**APOSTROPHE**, in Rhetoric: a figure by which a speaker, changing the course of his speech, addresses, with greater or less emotional emphasis, persons present or absent, the dead, or inanimate objects, either to invoke them as witnesses, or to pity, honor, praise, or blame them. When the figure is well managed, it has a thrilling effect, both in oratory and poetry; but when extravagantly introduced, it becomes ludicrous. Examples of it abound in the writings and speeches of the great poets and statesmen both of ancient and modern times.—**A.** in Grammar, is the omission of a letter or letters in a word, the omission being marked by a comma, as *'tis* for *it is*; the comma so employed is also called an *A*.



**APOTHECARY**, n. *a-pŏth'ē-kār-ĭ*, [L. *apothēca*, a store-house: Gr. *apothēkē*, a store or keeping-place—from *apo*, from; *thēkē*, a box or chest]: person trained in pharmacy, who prepares and sells drugs and medicines (see **CHEMISTS AND DRUGGISTS**): formerly, in England and Ireland, one of the members of a lower branch of the medical profession, licensed not only to sell drugs and medicines, but also to practice the healing art.

In England, the business or profession of an A., although not regulated, nor, indeed, fully recognized till modern times, was the subject of several ancient statutes, and is traceable to a remote period. Richard Fitznigel, who died Bp. of London, is stated to have been A. to Henry II.; and it is an accredited tradition, that in 1345 King Edward III. gave a pension of sixpence a day to Coursus de Gangland, an A. in London, for taking care of and attending him during his illness in Scotland. In 1543, parliament passed a curious act whose preamble deals severely with the ignorance and cupidity of the London surgeons; and provides for the toleration and protection of the irregular practitioners, who afterward, as a body, acquired the distinctive name apothecaries. This act complains that the surgeons of London were not only unskilful, but that they 'have sued, troubled: and vexed divers honest persons, as well men as women, whom God had endued with the knowledge of the nature, kind, and operation of certain herbs, roots, and waters, and the using and ministering of them to such as had been pained with customable diseases'; and it ordains that thereafter it shall be lawful for such persons so to use and minister their knowledge of medicines and of the art of healing.

Anciently, the apothecaries were not distinguishable from the grocers (the surgeons being, in like manner, undistinguishable from the barbers); indeed, it appears that apothecaries and grocers were synonymous terms. In a charter of 1606, the two bodies were expressly united; and it was not till 1617 that they were formed into two distinct corporations by a charter from James I. In 1815, the apothecaries, as a body, were placed on the footing of a liberal profession.

APOTHE'CIA: see LICHENS.

APOTHECIUM, n. *ăp'ô-thě'shĭ-ŭm* [Gr. *apothēkē*, a store—from *apo*, from; *thēkē*, a box or chest]: in *bot.*, a cluster or case of spore-cells in lichens, frequently cup-shaped.

APOTHEGM, n. *ăp'ô-thēm* [Gr. *apōphthēg'ma*, a thing uttered—from *apo*, from; *phthēgma*, a word]: a thing uttered; a sententious saying; a pithy, instructive remark: the oracles of the heathen gods often took this form, as also the proverbs, memorable sayings, etc., of the sages of antiquity. Lord Bacon made a charming collection of apothegms. APOTHEGMATIC, a. *ăp'ô-thēg-măt'ĭk*, or AP'OTHEGMAT'ICAL, a. *-ĭ-kăl*, after the manner of an apothegm. AP'OTHEG'MATIST, n. one who utters short maxims, or a maker of them. The old spelling is APOPH-THEGM.

APOTHEOSIS, n. *ăp'ô-thě'ô-sĭs* [L. and Gr. *apōtheōsis*, a deification—from *apo*, from; *theos*, God—*lit.*, from a man to a god]: in ancient Greece and Rome, the ceremony of placing some illustrious man among their gods; a deification, or the raising of a mortal to the rank of a god. From the polytheistic point of view there is nothing monstrous in this idea; on the contrary, it is quite natural, and a necessary part of the system. Among heathens generally, especially among the Romans, every departed spirit became a deity (see MANES); 'and as it was common for children to worship (privately) the manes of their fathers, so was it natural for divine honors to be *publicly* paid to a deceased emperor, who was regarded as the parent of his country.' (See SMITH'S *Dictionary of Greek and Roman Antiquities*.) At the *Consecratio*, as it was called, of a Roman emperor, the body was burnt on a funeral pile, and as the fire ascended, an eagle was let loose to mount into the sky, carrying, as was believed, the soul of the emperor from earth to heaven. Many medals are found with the word *consecratio* surrounding an altar, with fire on it, and an eagle rising into the air.

APOTHESES, n. *ă-pōth'ě-sĭs* [Gr. *apothēsis*, a putting back or away—from *apo*, from; *thesis*, a putting or placing]: in primitive churches, a place on the south side of the chancel fitted with shelves for books, vestments, etc.

APOTOME, n. *ă-pōt'ōmē* [Gr. *apotōmē*, a cutting off—from *apo*, from; *tomē*, a cutting or lopping]: in *math.*, the difference between two incommensurable quantities.

APOTREPSIS, n. *ăp-ō-trěp'sĭs* [Gr. *apotrepsis*, aversion]: in *med.*, the resolution of a suppurating tumor.

APOTROPY, n. *a-pōt'rō-pĭ* [L. *apotropæ*—from Gr. *apotropaïos*, averting evil]: in *Greek poetry*, a verse or hymn designed to avert the wrath of incensed deities. The divinity chiefly invoked on such occasions was Apollo.

APOZEM, n. *ăp'ô-zēm* [L. *apozema*: Gr. *apozema*—from *apozein*, to extract by boiling—from *apo*, from; *zein*, to boil]: a decoction; an extraction of the substance of plants by boiling them and preserving the infusion. APOZEMICAL, a. *ăp'ô-zēm'ĭk-ăl*, pertaining to, or resembling an apozem.



## APPAL—APPALACHIAN CLUB.

APPAL or APPALL, v. *ăp-pawl'* [W. *pallu*, to fail; *pall*, loss of energy (see PALL 2): usually referred to L. *ad*, at; *pallĕo*, I become pale]: to lose the vital powers through sudden terror; to fill with dismay. APPALL'ING, imp. APPALLED', pp. *-pawld'*. APPALL'MENT, n. state of being filled with dismay. APPALL'INGLY, ad. *-lĭ*. OLD APPALL'ED WIGHT, in *OE.*, a man who has lost his vigor through age. *Note.*—*Appall* is simply *ap* and *pall*, 'to cause to pall,' 'to stupefy with horror,' and ought not to be confused with *pale*, from *palleo*; OF. *je appalys*; compare It. *abbagliārĕ*, to dazzle or hurt the sight by excessive light.—SYN. of 'appal': to dismay; daunt; terrify; frighten; scare.

APPALACHEE BAY, *ăp-pă-lăch'ĕ*: a portion of the Gulf of Mexico on the Florida coast, lat. 30° n.; long. 84° 15' w. Its breadth is abt. 90 m., and it extends 50 m. inland. St. Mark's and several smaller rivers flow into it.

APPALACHEES: Choctaw tribe of Indians in Florida, on Appalachee Bay. At first friendly to the Spaniards, they afterwards revolted against the oppressions of the whites, and a number of hostile outbreaks occurred. They ceased to be a tribe of importance after 1722.

APPALACHIAN CLUB, *ăp'pa-lă'chĭ-an*: organization similar to the Alpine clubs of Europe (see ALPINE CLUB), originating in Boston about 1876, and having its principal field of labor in the great Appalachian mountain range. The objects sought are systematic exploration of the principal mountains, formation of new paths, placing of guide boards, and prevention of the painting of advertisements on rocks and of other disfigurements of the natural scenery. Discoveries and observations in geology, botany, zoology, and other sciences, are reported; much valuable information is thus accumulated. A large proportion of the members are residents of New England, but people of other sections are cordially received. Many professional men and a large number of amateurscientists belong to the organization, and find both health and pleasure in prosecuting its work.

## APPALACHIANS.

APPALACHIANS, *ăp'pa-lă'chĭ-anz*: general appellation of the great mountain-system—called also the Alleghanies—which stretches from the interior of Maine to the borders of Alabama, its distance from the sea gradually ranging between about 100 m. in the n. and about 300 in the s. Generally this chain may be regarded as the parent of the Atlantic rivers of the United States on the one side, and on the other of the s. tributaries of the St. Lawrence, and of the e. feeders of the Mississippi: it is not, however, the actual watershed during its entire length, for it is crossed by the Connecticut, the Hudson, and the Delaware, as the Himalayas are pierced by the Ganges, and the Andes by the Amazon. The chain, in fact, consists of several ranges generally parallel to each other, which, with the intermediate valleys that occupy two-thirds of the breadth, form a belt 100 m. wide—its multifarious character, however, developing itself only to the w. and s. of the Hudson. The following are the chief ridges, beginning from the n.: the White Mountains (or Hills) of New Hampshire present some of the loftiest elevations, Moose Hillock and Washington being respectively 4,636 and 6,285 ft. above the sea. Next, the Green Mountains, which, true to the name, almost cover Vermont, attain, in Killington Peak, a height of 3,924 ft.; then come the Highlands, on the e. of the Hudson, so striking an object to the voyagers on its waters; immediately beyond that river we find the Catskill Mountains, which, though of inconsiderable length, contain two eminences—Round Top and High Peak—respectively of 3,804 and 3,718 ft.; while on a terrace of another member of the group, 2,500 ft. above the Hudson, is perched the Mountain House, a favorite refuge from the heats of summer; other great summer hotels occupy other eminences of this group. The Kittatinnies extend from the n. of New Jersey as far as Virginia; while nearer the sea the Blue Ridge, stretching from about the same parallel down to North Carolina, is crowned, within the limits of Virginia, by the Peaks of Otter, 4,000 ft. high. In North Carolina are the Black Mountains, with the highest summit of the system, Black Dome, 6,760 ft.; Mt. Mitchell, 6,701 ft.; Guyot's Peak, 6,661; Sandoz Knob, 6,612; in all about a dozen peaks now known to be higher than Mt. Washington. Lastly, there lie, more to the w., the Alleghanies proper in Pennsylvania and Virginia, and the Cumberland Mountains on the e. border of Kentucky and Tennessee.

Of all these elevations not one at all approaches the limit of perpetual snow. Yet France, while struggling with England in North America, regarded the A. as a wall that was physically to exclude her rival from the basins of the St. Lawrence and the Mississippi. Virtually the supposed barrier has been levelled from end to end. Through Maine, New Hampshire, and Vermont runs a railway from Portland to Canada; by canal or by railway, even by both abreast, New York has reached the waters of the St. Lawrence on at least four principal points between Montreal in the e. and Buffalo in the w.; Pennsylvania has carried to Pittsburgh a railway of 248 m. from Harrisburg, and a canal of 312 m. from Columbia; while, with the necessary exception of little Dela-



## APPALACHIANS.

ware alone, each of the remaining states along the coast has its iron-way through the Appalachians.

The chain abounds in coal and iron; and it is a curious instance of the adaptation of the two worlds to each other, that, while the Spaniard met in the s. the gigantic counter-parts of the central plateau of his own romantic land, the Englishman in the n. stumbled, as it were, on those same elements of almost creative energy which, within two centuries, were to be instrumental in placing the daughter with the mother among the foremost nations of the earth. As an evidence of the actual value of the coal and iron of the A., Pennsylvania—where, hitherto, they have been chiefly found—has since 1840 made more rapid strides in population than any other state in the Union, till between 1860 and 1870, when Illinois and other n.w. states increased more rapidly. Nor are iron and coal the only valuable products of the A.: the mountains yield abundance of limestone, marble, slate, building stone, copper, zinc, chrome, etc.

*Geology.*—During the Azoic and Palæozoic periods, the district now occupied by the A. was a plain. These mountains date their origin subsequent to the Carboniferous epoch. The coal measures are the newest upturned beds associated with the Appalachian range; and as the stratified rocks, with few exceptions, are laid down horizontally, these strata must owe their inclined position to the dislocating agency which elevated the mountains; they, consequently, supply a date anterior to its activity. At the base of the A., on their e. side, there are a series of red sandstone beds, unconformable to the upturned strata, and occupying the valleys in their original horizontality, thus evidently unaffected by the disrupting agency which must have been active prior to their deposition. These beds have been referred by geologists to different ages. That they are Old Red Sandstone, as conjectured by Maclure and others, is now universally denied. Hitchcock's supposition that they were Permian is also considered as referring them to too remote a geological age. W. B. Rogers considered them first as members of the Triassic period; but has since, from evidence adduced from the contained organic remains, shown reason for relating them to the beginning of the Jurassic period. We thus obtain two grand limiting dates—the Carboniferous and Jurassic periods—within which the A. must have been formed. There are grounds for being even more specific, and referring the period of the dislocating agency to that immediately subsequent to the Carboniferous, represented in the stratified rocks of other districts by the Permian series; for the older upturned rocks had not only been ruptured and plicated, but also denuded into the various shapes that they now present, before the horizontal rocks were deposited.

The aggregate thickness of the Palæozoic, measured in Pennsylvania, amounts to 35,000 ft. While exhibiting a remarkable variety of mineral character, they may be classed under the three great divisions of sedimentary rocks, viz., sandstones, slates, and limestones. Intercalated with them, as subordinate layers, there occur deposits of coal, chert, and iron ore. They are all more or less fossiliferous.

## APPALACHICOLA.

*Coal Measures.*—The character of the rocks of the Appalachian district of N. Amer. indicates that during the Carboniferous epoch, a slow subsidence was in progress, the trough filling with the materials for sandstone and shale, afterward raised. There seem to have been vast, interior, marshy levels of such a character as to be able to support the vegetation, which has become, in the course of ages, converted into coal. The coal-fields to the far w. of the A., in Michigan, Indiana, Illinois, and Missouri, have been connected with the Appalachian coal formation, which includes all the detached basins, both anthracitic and semi-bituminous, of the mountain chain of Pennsylvania, Maryland, and Virginia, and also the vast bituminous trough lying to the n.w. in Pennsylvania, Ohio, Virginia, Kentucky, Tennessee, and Alabama.

On the e. slope of the A., the coal, from its proximity to the region of greatest disturbance, has lost nearly all its volatile constituents, and is converted into hard shining anthracite (q.v.). In the troughs to the w. of the great Appalachian valley, where the forces that disturbed the crust were not so intense, the coal has not parted with such a large proportion of volatile matter, but still is so much altered as to be characterized as semi-anthracite. Both the anthracite and semi-anthracite are extensively mined for economical purposes, but their extent as well as their value is of little importance compared with the enormous Appalachian bituminous coal-field. From northern Pennsylvania to middle Alabama, its length is about 875 m., and its greatest breadth between southern Pennsylvania and northern Ohio is about 180 m.; its area is abt. 56,000 sq. m., almost the largest expanse of coal measures in the world. A single coal-seam in this field has been traced over an extent of country 225 m. long by 100 broad, showing a superficial area of 14,000 sq. m. The actual depth of workable seams in the deepest part of this basin is estimated at 40 ft.; but when the amount of denudation of the upper measures over large districts is taken into account, the average depth of the entire field cannot be more than 25 ft. Taking this as the thickness, the amount of coal in this great coal field would be 1,387,500,000,000 tons. When this is compared with the estimated quantity of coal in the British coal-fields, viz., 140,000,000,000 tons, some conception may be formed of the enormous extent of coal existing in this district of N. America.

*Metals.*—Extensive beds of magnetic, hematitic, and fossiliferous iron ores occur in many of the formations of the A., from the lowest metamorphic gneiss to the highest coal-measures. Iron ore is extensively wrought in Pennsylvania and Ohio, large quantities of the anthracite being used in the smelting furnaces. Veins of lead occur in the Metamorphic rocks, rarely stretching up into the red slate. In the Palæozoic beds, veins of copper and nickel occur in sufficient quantity to be wrought.

APPALACHICOLA, *ăp'pa-lăch'ĭ-kô'la*: river rising in Georgia, flowing through Florida into the Gulf of Mexico, or rather into the A. Bay. From the head-waters of the



## APPANAGE—APPARATUS.

Chatahooche, the A. is about 400 m. long, navigable for boats through nearly its entire course. It is, however, only at the junction of the Chatahooche with the Flint that the name of A. is applied to the stream; and up to this point, a stretch of about 70 m., there is a sufficient depth of water for steam-navigation; while the tides also ascend for about two-thirds of the distance.—A. is also a seaport at the mouth of the stream above mentioned, where is shipped the produce of the river-basin, chiefly large quantities of cotton.

APPANAGE, *ăp'păn-ăj* [F. *apanage*, an appanage—from OF. *apaner*, to nourish: mid. L. *appanā'gium*, any pension or alimentation—from *ad*, to; *panis*, bread]: an allowance for bread and other victuals; lands set aside for the maintenance of younger sons of a prince; sustenance; wealth. A. is a technical term in French law, signifying the assignment or conveyance by the crown of lands and feudal rights to the princes of the royal family, for their maintenance according to their rank. See this title in Knight's *Political Dictionary*; also in Merlin's *Répertoire de Jurisprudence*. The word occurs in Scotch law-books, probably derived from the French. It is not a term in English law, though used in common parlance to denote any extra-territorial jurisdiction or sovereignty by governments; and even any dignity or right pertaining to a person of rank. The duchy of Cornwall may be said to be an A. of the Prince of Wales, in whose person also now merge the rights of the Prince of Scotland, since the junction of the two kingdoms under the same crown. The Prince of Wales, when he goes north of the Tweed, ought strictly to be called Prince of Scotland.

APPARATUS, n. *ăp'pă-ră'tūs* [L. *apparātus*, tools or implements—from *ad*, to or for; *parātus* prepared]: things prepared as means to any certain end; a set of instruments, tools, utensils, or mechanical arrangements to be used for a particular purpose; a set of organs uniting for a common function.

## APPAREL—APPARITIONS.

**APPAREL**, n. *ăp pār'ĕl* [F. *appareil*, outfit: Sp. *aparejar*, to fit, to suit: L. *ad*, for: mid. L. *paric'ulus*, a dim. of L. *par*, equal, like; hence F. *pareil*, alike—*lit.*, that which is fitted like to like]: clothing; dress: V. to dress; to clothe; to adorn. **APPARELLING**, imp. *ăp-pār'ĕl-ing*. **APPARELLED**, pp. *ăp-pār'ĕld*.—**SYN.** of 'apparel, n.': dress; clothing; vesture; garments; attire; array; costume; habit; clothes; vestment; rayment; uniform.

**APPARENT**, *ăp-pā'rĕnt* [see **APPEAR**]: term expressing a number of important distinctions, especially in astronomy. The *A. magnitude* of a heavenly body is the angle formed by two lines drawn from the ends of its diameter to the spectator's eye; this obviously depends upon the distance of the body, as well as upon its real magnitude. A planet seen from the surface of the earth seems lower than it would be if seen from the centre of the earth—the former is its *A. altitude*, the latter its real. *A. noon* is when the sun is on the meridian; true or mean noon is the time when the sun would be on the meridian if his motion in the heavens were uniform and parallel to the equator. See **EQUATION OF TIME**. The daily and annual motions of the sun in the heavens are both *A. motions*, caused by two real motions of the earth.

**APPARITIONS**, *ăp'pā-rish'ŭnz* [see **APPEAR**]: ghostly or phantom appearances. The belief in *A.*—especially of spirits of the departed—has existed in all ages and countries, and usually declines only when a people have advanced considerably in the knowledge of physical conditions and laws. Not that *A.* then cease to be reported, but that the more intelligent part of the community are then usually able to explain away the alleged occurrence in some way satisfactory to themselves, not involving the projection of a spirit upon the living sense.

Nothing is more certain than that there are conditions of the body when spectral appearances, such as occur to us in uneasy dreams, become sensible to the waking vision. One of these conditions is that of the patient under the disease of *delirium tremens*, who not only hears ideal enemies plotting against his life in adjacent rooms or behind hedges, but thinks he sees them preparing to do him mischief, and has been known to jump overboard of a vessel into the sea, in order to escape the apprehended danger. In such excitements it is, though arising from different causes, that an intending murderer thinks he hears the prince of fallen angels tempting him on to crime, or sees before him a 'dagger of the mind' wherewith to end the life of his victim. There are also instances of spectral illusions traceable to a simply disordered state of the digestive organs. M. Nicolai, an eminent bookseller in Berlin, fell, in the early part of the year 1791, into a depression of spirits, and in that condition neglected a course of periodical bleeding which he had been accustomed to observe. The consequence was his becoming liable for some months to seeing trains of phantasmata or spectral figures, which moved and acted before him, nay, even spoke to, and addressed him. He was fortunately able, not merely to coolly observe the phenomena, but to



## APPARITION—APPEAL.

describe them in an ample paper which he presented to the Philosophical Society of Berlin. This case may be said to have formed the basis of a theory of A., advanced by Dr. Ferrier, Dr. Hibbert, and others, amounting merely to this, that they are all to be accounted for by peculiar conditions of the organism of the individual sensible of them. Certainly a large class of cases fall readily under this explanation; but, if we are to accept the whole number of apparitions reported on good authority, a much more comprehensive theory will be found requisite to satisfy the thorough inquirer.

In 1882, the Society for Psychical Research was founded in order to the scientific and systematic investigation of reported apparitions, clairvoyance, haunted houses, hypnotism, thought-reading, and the phenomena called spiritualistic; and it publishes its *Proceedings*. See HYPNOTISM: SOMNAMBULISM: also HALLUCINATIONS.

**APPARITION:** see under **APPEAR**.

**APPEAL**, *v.* *ăp-pēl'* [*L. appello*, I accuse, I call upon; *F. appeler*, to call; *OF. apeler*, to invoke, to call upon—from *ad, pello*, I drive]: to call to or invoke; to apply for justice; to refer a disputed matter to another, as to a higher judge or court, or to a superior; recourse; resort; in *OE.*, to accuse; to charge with crime: *N.* the removing of a cause from a lower to a higher court; a reference to another; an address to the judgment or feelings of an audience; an application for justice. **APPEAL'ING**, *imp.* **APPEALED**, *pp.* *ăp-pēld'*. **APPEALABLE**, *a.* *ăp-pēl'a-bl*, that may or can be appealed. **APPELLANT**, *n.* *ăp-pēl'lānt*, the person who appeals. **APPEAL'ER**, *n.* one who. **APPELLATE**, *a.* *ăp-pēl'lāt*, or, **APPEL'LATOR'Y**, *a.* *-ter'ī*, relating to appeals. **APPELLATION**, *n.* *ăp-pēl-lā'shūn*, a name; the word by which a thing is known. **APPEL'LATIVE**, *a.* *-tīv*, pertaining to a common name. *N.* a common name as distinguished from a proper name. **APPEL'LATIVE'LY**, *ad.* *-tīv'li*. **APPELLEE**, *n.* *ăp-pēl-lē'*, the defendant in an appeal; one tried for a crime at the instance of another—now obsolete. **APPELLOR**, *n.* *ăp-pēl'lōr*, one who appeals. — **SYN.** of 'appellation': title; name; description; denomination; designation.

**APPEAL**, in Law: the right or process of bringing under the notice of a higher court the judgment of a lower court which the appellant represents as erroneous in fact or law. Formerly this right was a valuable guarantee against political oppression and private extortion: for example the A. to royal judges from courts of feudal barons. Now, the object of A. is to secure uniformity in the administration of justice. This is effected not merely by the reversal of erroneous judgments which are appealed, but by the knowledge which every judge has of precedents in the Supreme Court, and that his own judgments are subject to A. The most important questions connected with the modern system of A. are: 1. Whether in all cases, of whatever pecuniary value, A. is allowed, and also whether at all stages, or only after final judgment; 2. On what conditions

## APPEAL.

as regards time, *interim* execution, and security for costs, A. is allowed; 3. The relative constitution of the lower and higher courts.

In the civil law, the earliest form of A. was the *provocatio* from the judgment of a criminal court to the Roman people. This fell into disuse under the *Quæstiones Perpetuæ*. The *appellatio* was a veto or interdict granted upon the *intercessio* of one complaining of a judicial act. The subordination of judges increased largely under the empire, and for some time the emperor, who was tribune for life and also pro-consul, was the only final court of A. Latterly, the senate and the prætorian prefects also gave final decisions. Only six months were given for A. from the most distant provinces. The law is stated in detail in the Digest, Lib. XLIX.

In the Christian Church, under the judicial system defined in the False Decretals, frivolous appeals direct to the Roman Consistory multiplied enormously. The remonstrances of St. Bernard were gradually given efficiency by the Lateran and Basel councils, and wholesome restrictions on the right of A., and in favor of the independence of Cisalpine church courts, passed into most modern concordats (Fleury, *Inst. du Droit Eccles.*, iv. 23; Lancelot, *Inst. du Droit Canon.*, iii. 17). The famous *appel comme d'abus* in France was originally an A. to civil justice against the encroachments of church jurisdiction. It is evident that the question of A. is closely connected with the great problems of political history—national independence, the relations of central and provincial authorities, etc.

In English law, prior to the Judicature Acts, 1873–75, the word A. was not commonly used. In common law courts, there was a proceeding in ‘error’ by ‘assignment of errors’ and ‘joinder of errors.’ The old ‘writ of error’ and ‘writ of false judgment’ are still sometimes used in England in bringing up the proceedings of certain inferior courts. In chancery the A. was formerly called ‘re-hearing,’ the Vice-chancellor being regarded as the delegate of the Lord Chancellor. Under the modern system of ‘fusion,’ every judgment in the High Court of Justice (except the judgment of the Court of Probate where leave is required) may by simple motion be submitted to the Court of A., to have it reversed, discharged or varied. Interlocutory proceedings in chambers may also be appealed to a judge in chambers; and from him A. lies to the Divisional Court. In the Chancery Division, the judge has the discretion of directing the matter to be argued before him in court, or allowing A. direct to the Court of A. The A. from the London Bankruptcy Court is also to the Court of A. An A. in divorce requires in many cases to be to the ‘full court,’ not to the ordinary Court of A. This last court consists practically of six Lords Justices of A., sitting in two divisions; one for common law A.; the other for chancery, probate, admiralty, and bankruptcy appeals. As regards A. from the inferior courts in England, an A. lies from the county court to a divisional court of the High Court of Justice, if the judgment has been pronounced in the ordi-



## APPEAR—APPEND.

nary or admiralty jurisdiction of the county court, but to the London Bankruptcy Court, if the judgment has been pronounced in the bankruptcy jurisdiction of the county court.

In American Law, A. is the removal of a cause from a court of inferior to one of superior jurisdiction, in order to obtain a review of the proceedings and a re-trial. While a writ of error carries to the higher court only matter of law for re-examination, an appeal subjects both the law and the facts to review and re-trial, the whole case being examined and tried, precisely as if it had not been tried before. While an appeal is pending, no action can be taken on the judgment of the inferior court, or until after the final decision of the cause. In the matter of the regulation of appeals, the rules differ widely in the different states, while the federal courts have a practice of their own.

APPEAR, v. *ăp-pēr'* [L. *ap'parērē*, to come in sight—from *ad*, to; *parēō*, I am seen, I appear: F. *apparaître*]: to be visible; to come in sight; to seem; to present one's self. APPEAR'ING, imp. APPEARED, pp. *ăp-pēr'd'*. APPEAR-ANCE, n. *ăp-pēr-āns*, a coming in sight; the thing seen; the look of a person or thing; show or exhibition of one's self; pretense; show. APPEAR'ER, n. the person that appears. APPARENT, a. *ăp-pā'rēnt*, that may be easily seen; obvious; plain; in *science*, not real—as *apparent motion*. APPA'RENTLY, ad. *-lī*, manifestly; clearly; openly; seemingly. APPARITION, n. *ăp-pā-rish'ūn*, a ghost; a spectre; a supposed visible spirit. APPARITOR, n. *ăp-pār-ī-ter*, the attending officer of an ecclesiastical court; a summoner.—SYN. of 'appearance': air; aspect; figure; mien; manner; semblance; look; pretense; arrival; coming;—of 'apparent': clear; visible; manifest; obvious; plain; conspicuous; evident; distinct; certain; notorious;—of 'apparition': ghost; spectre; phantom; vision; phantasm.

APPEASE, v. *ăp-pēz'* [F. *apaiser*, to appease—from L. *ad*, *pacem*, peace]: to put into a state of peace; to quiet; to pacify. APPEAS'ING, imp. APPEASED, pp. *ăp-pēz'd'*. APPEAS'ER, n. one who. APPEASE'MENT, n. state of being appeased or in peace. APPEASABLE, a. *ăp-pēz'ābl*, that may be appeased. APPEAS'ABLENESS, n. the quality of being appeasable. APPEAS'IVE, a. *-zīv*, quieting. APPEAS'IVELY, ad. *-lī*.—SYN. of 'appease': to alleviate; pacify; mitigate; soothe; assuage; allay; relieve; quiet; conciliate; propitiate; compose; calm; hush; cool; tranquillize.

APPEND, v. *ăp-pënd'* [F. *appendre*, to hang up—from L. *appendērē*, to hang to—from *ad*, to; *pēndēō*, I hang]: to attach or hang to; to add to. APPEND'ING, imp. APPEND'ED, pp. APPENDAGE, n. *ăp-pēn'dāj*, or APPEN'DANT, n. something added to without being essentially necessary. APPEN'DANT, a. belonging to; attached. APPENDICLE, n. *ăp-pēn'dī-kl*, a small appendage. APPENDIX, n. *ăp-pēn'dīks*; APPEN'DIXES, n. plu. *-dīks-ēz*, or APPEN'DICES, n. plu. *-dī-sēz* [L. *appendix*]: something appended or added, as at the end of a book; a supplement. APPENDICULATE, a. *ăp-pēn-dīk-ul-āt* [L. *appendic'ulā*, a small

## APPENDICITIS—APPERLEY.

appendage]: in *bot.*, having a little appendage, as the scaly appendages of corollas, or found at the base of certain filaments.—*SYN.* of ‘append’: to add; annex;—of ‘appendage’: addition; adjunct; concomitant.

APPENDICITIS, *n.* *ăp-pĕn-dĭ-sĭ'tĭs* [*L.* from *appendix*]: inflammation of the vermiform appendix (see APPENDIX VERMIFORMIS). One, not the usual, cause may be lodgment of a foreign body, such as fruit-pits, or a small mass of hardened fæces, in the cavity of the vermiform appendix. An inflammation, from whatever cause being set up on the inner coat of the appendix, extends, and attacks the middle, and lastly the external coat, or peritoneum. The result is usually a localized peritonitis (perityphlitis), though it may become general. The intestinal tract never being in an aseptic condition, septic infection followed by suppuration is common, with perforation of the appendix and discharge of pus into the abdominal cavity. A. is best treated with perfect rest in bed and with a bland non-irritating fluid diet. Quietude of the intestines is secured by opiates. If perforation occurs, the only hope is in a surgical operation.

APPENDIX VERMIFORMIS, *ăp-pĕn'dĭks vĕr-mĭ-fōrm'is* [*L.* *appendix*, appendage; *vermiformis*, worm-shaped]: in *anat.*, the vermiform appendix, a blind, worm-shaped process given off from the cæcum (*q.v.*): in man it is of about the calibre of a goose-quill, and 3–6 in. long. Its functions are unknown. It is sometimes the seat of very dangerous inflammation: see APPENDICITIS.

APPENZELL, *ăp-pĕnt-sĕl'* [from *Abbatis Cella*]: canton in the n.e. of Switzerland; 162 sq. m. Divided into two districts—Innerrhoden and Ausserrhoden, the former of which is peopled by Rom. Catholics, the latter by Protestants, and noted for its dense population. The surface is mountainous, especially in the s., where Mount Sentis attains an elevation of 8,232 ft. The chief river is the Sittern, which flows through the centre of the canton. A. holds the 13th place in the Swiss confederacy; the constitution of each half of the canton is a pure democracy. The inhabitants are chiefly employed in agriculture, cattle-keeping, cotton manufactures, and embroidery. They are fond of dancing, music, and athletic exercises, and have the reputation of being first-rate marksmen. Pop. (1900) 68,780.

APPENZELL, *cap.* of the canton of A., is on the left bank of the Sittern; lat 47° 29' n., and long. 9° 24' e. Pop. 4,000: see also HERISAU (pop. 11,000).

APPERCEIVE, *v.*: in *OE.*, for PERCEIVE.

APPERCEPTION, *n.* *ăp'pĕr-sĕp'shŭn* [*ad.* and *perception*]: degree of perception which becomes conscious of itself (used in psychometry); *a priori* self-consciousness.

APPERIL, *n.*: in *OE.*, for PERIL.

APPERLEY, *ăp'pĕr-lĭ*, CHARLES JAMES: 1777–1843, May 19; b. Denbighshire, Wales: enthusiastic hunter, the ‘Nimrod’ of the *Quarterly Review*, and writer of articles on hunting in the *Sporting Magazine*. See *The Chase, the Turf, and the Road, Quarterly Review* (1827).



APPERT, *ap-pür*, BENJAMIN NICOLAS MARIE: b. Paris, 1797, Sep. 10: French philanthropist. He devoted himself to physical and moral reforms in prisons and hospitals, and to improvement in schools. Among his works are *Dix Ans à la Cour du Roi Louis Philippe*; and *Conférences contre le Système Cellulaire*, opposing solitary confinement.

APPERT, FRANÇOIS: b. France: inventor of a method of preserving meat, vegetables, etc., without use of salt, described in his work (Paris 1831).

APPERTAIN, *v. äp'për-tän'* [mid. L. *apper'tinērē*—from *pertinērē*, to pertain to, to belong—from L. *ad*, to; *per*. through; *tenēo*, I hold: F. *appartenir*]: to belong to as of right; to belong to; to relate to. AP'PERTAIN'ING, imp. AP'PERTAINED', pp. *-tānd'*. AP'PERTAIN'MENT, n. that which appertains to. APPERTENANCE, n. *äp-për'tě-nāns*, that which relates to another thing. APPER'TINENT, a. belonging: N. that which belongs to anything else.

APPETENT, a. *äp'pě-těnt* [L. *ap'pētens* or *appēten'tem*, eager for—from *ad*, for; *pěto*, I seek, I desire]: seeking eagerly for; desiring; very desirous. AP'PETENCE, n. *-těns*, or AP'PETEN'CY, n. *-těn'si*, eager desire; appetite; the propensity in living creatures to select and feed upon such substances as are suited for their nourishment. APPETIBLE, a. *äp'pě-ti-bl*, pleasing; desirable. APPETIBILITY, n. *äp'pě-ti-bil'i-ti*. APPETITE, n. *äp'pě-tit* [F. *appetit*, appetite—from L. *appetitus*, eager desire]: the natural desire or craving for food or drink; a strong desire for anything that affords pleasure. APPETITIVE, a. *äp'pě-ti'tiv*, desiring gratification. APPETIZING, a. *äp'pě-tiz'ing*, that creates or promotes a desire to eat, as *appetizing* food.—SYN. of 'appetite': passion; appetency; desire; a longing; a craving; eagerness; hunger.

APPETITE: see DIET: DIGESTION: FOOD AND DRINK.

APPIANI, *äp-e-ä'nē*, ANDREA: 1754, May 23–1817, Nov. 8; b. Milan: styled in his day 'the Painter of the Graces.' His poverty compelled him to gain a subsistence by decorative painting; but in the course of his travels he studied the works of great masters, and formed for himself an original style, almost rivalling that of Correggio. At Rome, he devoted his attention to the frescoes of Raphael, and made such progress, that he soon excelled all living artists in fresco-painting. The best evidences of his genius are found in the cupola of the church of *Sta. Maria di S. Celso* at Milan; and in the frescoes with which he decorated the villa of the archduke Ferdinand in 1795. Napoleon I. appointed him court-painter. In return, he executed portraits of the French emperor and several of his generals. His most beautiful frescoes are the paintings on the ceilings of the palace of Milan, which consist of allegorical illustrations of Napoleon's career; and Apollo with the Muses in the Villa Bonaparte. Almost all the palaces in Italy contain frescoes by A. His finest oil-painting is Rinaldo in the garden of Armida. The fall of his patron, Napoleon I., left A. in indigence.

APPIANUS, *äp'pī-ä'nūs*: native of Alexandria, who lived

## APPIAN WAY—APPIUS CLAUDIUS CRASSUS.

during the reigns of Trajan, Hadrian, and Antoninus Pius. He was author of a Roman history, in 24 books, of which only 11 are extant. It was not remarkable for anything except the plan on which it was written. Instead of proceeding to exhibit chronologically the growth of the empire, from its rude beginning on the Palatine Hill to the period when its power held the whole world in awe, which is at once the popular and the philosophical method, he divided his work into ethnographic sections, recording separately the history of each nation up to the time of its conquest by the Romans. First in order were the books devoted to the old Italian tribes, and afterwards followed the history of Sicily, Spain, Hannibal's wars, Libya, Carthage, and Numidia, Macedonia, Greece Proper and its colonies, Syria, Parthia, the Mithridatic war, the civil wars, and the imperial wars in Illyria and Arabia. As a historian, A. is a mere compiler, and not very accurate in his compilation. His geographical knowledge is singularly deficient, considering the age in which he lived; e.g., in his section on Spain, he states that it takes only half a day to sail from Spain to Britain. The edition of A. by Schweighäuser is highly esteemed, but the most complete is that in the *Bibliothèque Grecque* of Firmin Didot.

APPIAN WAY, *ăp'pĭ-ăn* [Lat. *Via Appia*]: well named by an ancient writer *Regina Viarum* (the queen of roads); formed, in part at least, by Appius Claudius Cæcus, while he was censor, B.C. 313. It is the oldest and most celebrated of all the Roman roads. It led from the *Porta Capena* at Rome in a southerly direction to Capua, passing through Three Taverns, Appii Forum, Terracina, etc. Subsequently, it was carried on to Beneventum, Tarentum, and thence to Brundisium. It had an admirable substructure or foundation, from which all the loose soil had been carefully removed. Above this were various strata cemented with lime; and, lastly, came the pavement, consisting of large hard hexagonal blocks of stone, composed principally of basaltic lava, and jointed together with great nicety, so as to appear one smooth mass. The remains of it are still visible, especially at Terracina. The cost must have been enormous, for the natural obstructions are great. Rocks had to be cut through, valleys filled up, ravines bridged, and swamps embanked.

AP'PIUS CLAU'DIUS CRAS'SUS: a Roman decemvir (in office, B.C. 451–449). While the other decemviri were engaged in repelling an incursion made by the Sabines, A. C. and his colleague Oppius remained in Rome, with two legions to maintain their authority. Meanwhile, A. C. had been smitten by the beauty of Virginia, daughter of a respected plebeian named Lucius Virginus, who was abroad with the army. By force and stratagem, representing that she was the born slave of Marcus Claudius, one of his clients, A. C. gained possession of the maid. His design was penetrated by Icilius, who was betrothed to Virginia, and who, aided by Numitorius, her uncle, threatened to raise an insurrection against the decemviri. Virginus hurriedly



## APPLANATE—APPLAUD.

recalled from the army by his friends, appeared and claimed his daughter; but, after another mock-trial, she was again adjudged to be the property of Marcus Claudius. To save his daughter from dishonor, the unhappy father seized a knife and slew her. The popular indignation excited by the case was headed by the senators Valerius and Horatius, who hated the decemvirate. The army returned to Rome with Virginius, who had carried the news to them, and the decemviri were deposed. A. C. died in prison by his own hand (as Livy states), or was strangled by order of the tribunes; his colleague, Oppius, committed suicide; and Marcus Claudius was banished. The *Claudia Gens* (see GENS) was one of the most numerous and important of the patrician tribes or clans of Rome; and besides the sons and grandsons of the decemvir, there were numerous persons of distinction who bore the name of Appius.

APPLANATE, a. *ăp'plăn-ăt* [L. *ad*, to; *planātus*, made flat—from *plānus*, level, flat]: in *bot.*, flattened out; horizontally expanded.

APPLAUD, v. *ăp-plawd'* [L. *applaud'ērē*, to strike one thing upon another—from *ad*, for; *plaudo*, I make a noise by clapping the hands: F. *applaudir*]: to praise by clapping the hands or by some loud noise; to express approbation of; to commend. APPLAUD'ING, imp. APPLAUD'ED, pp. APPLAUD'ER, n. one who. APPLAUSE, n. *ăp-plawz'* [L. *ad*, *plausus*, having clapped the hands]: approbation by shout or clapping of hands, or in some other noisy way; the act of praising. APPLAUSIVE, a. *ăp-plaw'zīv*, that contains applause.—SYN. of 'applaud': to praise; commend; extol; approve; magnify;—of 'applause': acclamation; acclaim; commendation; plaudit; praise.

## APPLE.

APPLE', n. *äp'pl* [AS. *aepl*: W. *apal*: Icel. *epli*: Dan. *äble*]: a well-known fruit of the tree *Pyrus mālus*, ord. *Rosaceæ*. APPLE OF THE EYE, the pupil. APPLE OF DISCORD, a subject of contention and envy. APPLES OF SODOM, the fruit of a plant growing near the Dead Sea, as described by Josephus; fruit fair to the eye, but dissolving into dust and ashes when plucked. See SOLANUM. LOVE-APPLE, the tomato.

APPLE: well-known fruit of the tree *Pyrus mālus*, ord. *Rosaceæ*. See PYRUS. The wild A., or CRAB-tree, very generally found in temperate climes of the n. hemisphere, a rather small and often somewhat stunted-looking tree, with austere, uneatable fruit, supposed to be the parent of the prized varieties of apple. The apple-tree, even in a cultivated state, is seldom more than 30–40 ft. high. It has a large, round head; the leaves are broadly ovate, much longer than the petioles, woolly beneath, acute, crenate, and provided with glands; its flowers are always produced 3–6 together, in sessile umbels, and are large, white, rose-colored externally, and fragrant. The fruit is roundish, or narrowest toward the apex, with a depression at each end. That of different varieties varies greatly in color and size. It is produced on spurs, which spring from branchlets of two or more years' growth, and continue to bear for a series of years. The fruit of the A. is, with regard to its structure, styled by botanists a *pome* (q.v.). The eatable part is what is botanically termed the *mesocarp* (see FRUIT), which, in its first development, enlarges with the calyx, the summit of the fruit being crowned at last by the dried 5-parted limb of the calyx; the *endocarp* being, when ripe, cartilaginous, and containing in its cells seeds which do not correspond with them in size, but are so free as often to rattle when it is shaken. The flavor is more or less aromatic, and ranges in different sorts from sweet to acid. The time of ripening varies from early summer to late autumn. Some kinds can be kept only a few weeks; others retain their flavor six or eight months.

The A. thrives best in the middle portion of the temperate zone. In high n. latitudes only a few varieties can be grown, and these of inferior quality. In warm regions the fruit is small and insipid. Some 4,000 varieties are cultivated, and the number is being rapidly increased. There are kinds suited to all climates in which the A. can be grown, to all tastes, and to all the different purposes (dessert, cooking, cider, etc.) for which the fruit is used. Many varieties have merely a local reputation; others are widely distributed. The quality of certain sorts is greatly modified by soil, climate, and cultivation. New varieties are obtained from seed, but not more than one in several thousand proves superior to kinds already grown.\* Propagation of varieties is principally by grafting (q.v.) and budding (q.v.) on stocks grown from seed (see NURSERY). Though sometimes dwarfed, the A. is usually grown as a standard (see ORCHARD). To secure trees sufficiently hardy to endure the climate of the colder regions of the United States, varieties have been imported from Russia, but they



## APPLE.

have not proved uniformly successful. The A. needs a good soil and careful attention. To promote the growth of the tree and the production of fruit, fertilizers containing liberal quantities of phosphoric acid, potash, and lime, should be supplied. If properly cultivated, good trees



Apple-blossom.

from the nursery should bear a few specimens of fruit 3 years from planting, and in 10 years should yield paying crops, though some varieties are much slower than others in coming into bearing. The wood of the A. is hard, has a fine grain, and takes a handsome finish. The tree is hardy and vigorous, though the improved varieties are much less so than the natural sorts; and it lives 50 to 150 years. The Crab A. is often planted as an ornamental tree, and some of the Siberian varieties are vigorous growers, liberal bearers, and yield handsome fruit, of which many specimens are 1 to 2 in. in diameter. The fermented juice of the A. is called cider (q.v.); with age and exposure to the air it turns into vinegar (q.v.). That of the Crab A. is called verjuice. The A. is subject to various diseases, and is preyed upon by about 175 species of insects, which attack every part of the tree, and the fruit. For remedies for plant-lice, see APHIS; for various caterpillars and worms, spray with the Bordeaux mixture (q.v.) or a solution of Paris green (1 lb. to 200-300 gals. of water). For methods of preventing and destroying this pest, see BORER. The scab, a fungoid disease, affects the leaves and fruit; also the leaves are affected by various forms of blight and rust. Spraying with the Bordeaux mixture seems the most efficient remedy. A vigorous condition tends to prevent attacks of disease and insects. There is quite an export trade in apples, and immense quantities are required for home consumption. The census 1890 indicated that in the U. S. more than 240,000,000 A. trees were being grown for transplanting.

Beaufins or Biffins are apples slowly dried in

## APPLEBERRY—APPLETON.

ovens, and occasionally pressed till they become soft and flat. They are prepared in great quantities in Norfolk, Eng.

The SIBERIAN CRAB is perhaps the parent, by hybridization or otherwise, of some of the varieties of *A.* now in cultivation. Two species partake this designation, both natives of Siberia, and frequent in gardens in Britain. *Pyrus baccata* of Linnæus, and *Pyrus prunifolia* of Willdenow, which, however, scarcely differ, except that in the former the sepals (leaves of the calyx) are deciduous, in the latter they are persistent—a circumstance of very doubtful importance as a specific distinction. The fruit is sub-globose, yellowish, and rather austere, but is good for baking and for preserves.

The AMERICAN CRAB or SWEET-SCENTED CRAB (*P. coronaria*) is a native of N. America, especially of the s. part of the Alleghanies. It is a small tree with broad leaves and white flowers, becoming purple before they drop off, and which have a powerful smell, resembling that of violets. The fruit is flatly orbicular, of a deep green color, and sweet scented. It is very acid, but is made into cider, and also into preserves. *P. angustifolia*, a native of Carolina, much resembles this, but has much narrower leaves and smaller fruit.

The CHINESE CRAB (*P. spectabilis*) is a small tree, a native of China. It is very ornamental when in flower; the flowers being in sessile, many-flowered umbels, and of a bright rose-color. The fruit is irregularly round, about the size of a cherry, yellow, and fit to be eaten, like the medlar, only when in a state of incipient decay.

APPLEBERRY: see BILLARDIERA.

APPLEBY, *äp'pl-be*, county town of Westmoreland, Eng.: lat. 54° 35' n., long. 5° 28' w. It is in the n. of the co., on the river Eden, which flows past Carlisle into the Solway Firth. A. has two parishes, one on each side of the river, which is here crossed by an old stone bridge of two arches. There is a castle in the town, the keep of which, called Cæsar's Tower, is still in moderately good condition. The lent and summer assizes are held at A. Until the passing of the Reform Bill, it returned two members to parliament. It was then disfranchised, though it still possesses a municipal corporation. Pop. (1891) 1,776.

APPLETON, *äp'pl-tön*: town, cap. of Outagamie co., Wis., on the Grande Chute of the Fox river. The Grande Chute, from which the town sometimes takes its name, affords immense water-power; and at the same time a series of dams renders the stream navigable for steamboats through its whole course—a navigation which, with the aid of a canal between the Fox on the n., and the Wisconsin to the s., is carried all the way from Lake Michigan to the Mississippi. There is extensive manufacturing, and much enterprise. The place is the seat of Appleton College, and Lawrence University. Pop. (1890) 11,825; (1900) 15,085.



## APPLETON—APPLICATE.

APPLETON, DANIEL: publisher, founder of the house of D. Appleton and Co.: 1785, Dec. 10—1849, Mar. 27; b. Haverhill, Mass. After keeping a dry-goods store at Haverhill, he removed to Boston, and 1825 to New York. In the latter city, he placed his eldest son, William Henry A., in charge of a book department which he added to his dry-goods line, and which it soon superseded. For a time, the business was principally confined to the importation and sale of English works, and an agency was established in London 1835. The first publication was a 32mo book entitled *Daily Crumbs from the Master's Table*. William H. A. was taken into partnership 1838, and 10 years later the father retired. The business is now conducted by several grandsons of the founder and their publications have been largely in the higher lines of literature.

APPLETON, GEORGE SWETT: publisher: 1821, Aug. 11—1878, July 7; b. Andover, Mass.; son of Daniel A. After studying at Phillips Acad., in his native town, he spent four years at the Univ. of Leipzig. In 1865 he became a partner with three of his brothers in the firm of D. Appleton & Co. He developed a large trade in Spanish works, and introduced the department of illustrated books, of which the first venture was *Picturesque America*, then the finest illustrated work ever issued.

APPLETON, JESSE, D.D.: 1772, Nov. 17—1819, Nov. 12; b. New Ipswich, N. H.: educator. He graduated at Dartmouth College, taught for two years, studied theol., and became pastor of a Congl. church at Hampton, N. H., 1797. He was elected pres. of Bowdoin College 1807. He was an excellent classical scholar and an impressive preacher. A biographical sketch, with a collection of addresses, was published 1820, sermons and lectures 1822, and *The Works of Jesse Appleton, D.D.*, 2 vols., 1836.

APPLETON, NATHAN, LL.D.: 1779, Oct. 6—1861, July 14; b. New Ipswich, N. H.: merchant. He left college to enter the store of his brother, Samuel A., in Boston, with whom he soon formed a partnership. He was interested in the cotton factory at Waltham, in which power-looms were first used in this country; was one of the founders of the city of Lowell, a member of the state legislature for several terms, and was elected to congress 1830 and 42. He was a member of various learned societies, and very benevolent.

APPLETON, SAMUEL: 1766, June 22—1853, July 12; b. New Ipswich, N. H.: merchant. He worked on a farm, taught school, kept a store in his native town, removed to Boston 1794, and engaged in importing, and soon formed a partnership with his brother Nathan A. He also became interested in cotton manufacturing at Waltham and Lowell, and accumulated great wealth. He often distributed his entire annual income in charity.

APPLIABLE, APPLIANCE, etc.: see under APPLY.

APPLICATE, n. *ăp'plĭ-kāt* [L. *applicātus*, joined or at

## APPLIQUE—APPOINT.

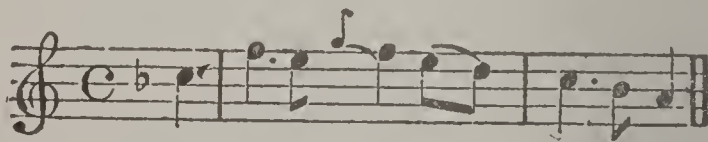
tached—from *ad*, to; *plīco*, I fold]: in *geom.*, a straight line drawn across a curve so as to be bisected by the diameter, the ordinate.

**APPLIQUE**, a. *ăp-plēk'* [F.—from *appliquer*, to apply, to put on]: a style of work in which one material is laid upon another, as velvet on satin or cloth.

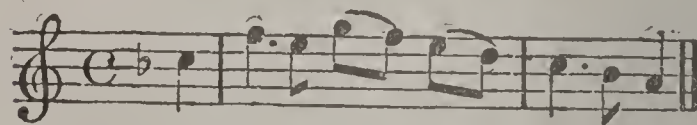
**APPLY**, v. *ăp-plī'* [OF. *applier*, to apply: L. *applicāre*, to fold upon—from L. *ad*, to; *plīco*, I fold]: to lay on; to put one thing to another; to use or employ for a particular purpose; to fix the mind with attention; to make application; to suit; to keep at work. **APPLY'ING**, imp. **APPLIED**, pp. *ăp-plīd'*: **ADJ.** said of a science whose laws have been reduced to rules for practical use, as *applied* chemistry, *applied* mathematics. **APPLI'ER**, n. one who. **APPLIABLE**, a. *ăp-plī'ă-bl*, that may be applied. **APPLI'ABLY**, ad. *blī*. **APPLIANCE**, n. *ăp-plī'ăns*, the act of applying; the thing applied; means to an end; resource. **APPLICABLE**, a. *ăp-plī-kă-bl*, fit to be applied; suitable. **AP'PLICABIL'ITY**, n. *-kă-bīl'ī-tī*, or **AP'PLICABLENESS**, n. *-bl-nēs*, the quality of being applicable or fit to be applied. **AP'PLICABLY**, ad. *-blī*. **APPLICANT**, n. *ăp-plī-kănt*, one who applies; a petitioner. **APPLICANCY**, n. *ăp-plī-kăn-sī*, the state of being applicable. **AP'PLICA'TION**, n. *-kă'shŭn*, the act of applying; close study; great attention to, as to business; entreaty; employment of means. **AP'PLICATIVE**, a. *-kă-tīv*, capable of being applied. **AP'PLICATORY**, a. *-kă-tēr-ī*, capable of being applied: **N.** that which applies.

**APPOGGIATURA**, *ăp-pŏj'ă-tŏ'ră* [It.]: in *music*, a grace-note: a form of embellishment by insertion of notes of passage in a melody. The A. notes are printed in a smaller character than the leading notes of the melody, and should always be given with considerable expression. When they are extemporized by a performer or singer, they serve as an indication of good or of bad taste. The time of an A. is taken from the essential note to which it belongs, as in the following example:

*Written.*



*Played.*



For **APPOGIA'TO**, see **PORTAMENTO**.

**APPOINT**, v. *ăp-poynt'* [F. *appointer*, to refer a cause, to give wages; *appointer*, to order, to finish a controversy—from L. *ad*, to; *punctum*, a point]: to find fitting; to settle the exact time for a transaction; to fix upon; to settle; to ordain; to furnish. **APPOINT'ING**, imp. **APPOINT'ED**, pp



## APPOINTMENT—APPORTION.

**APPOINT'ER**, n. one who. **APPOINT'ABLE**, a. -ă-bl, that may be appointed. **APPOINT'MENT**, n. state of being appointed; being named for an office; a situation or office; established order. **APPOINT'MENTS**, n. plu. the accoutrements of an officer. See **EQUIPMENT**: **KIT**: **KNAPSACK**. The appointments of a ship are, collectively, all her various articles of equipment and furniture. **APPOINTEE**, n. ăp-poyñ-tē', one appointed.—**SYN.** of 'appoint': to allot; nominate; prescribe; constitute; ordain; order;—of 'appointment': designation; command; order; direction; establishment; equipment.

**APPOINTMENT**, in Law: in England, conveyances granted on a consideration are frequently reserved in common law; and in family settlements, certain *powers*, as they are called, such as powers of jointuring, selling, charging land with the payment of money; and the subsequent exercise of the power is called an *A.* This *A.*—which may be made either by deed or by will—is not considered as an independent conveyance, but is merely ancillary to the deed or instrument in which the power of *A.* is reserved, and from which the party in whose favor the *A.* is made for most purposes derives his title. The Courts of Equity give relief against a defective *A.*, or defective execution of a power, where there is what is called a 'meritorious consideration' in the person applying for such relief. As to what amounts to such meritorious consideration, Lord St. Leonards, in his work on Powers, lays down that Equity will relieve the following parties: 1. A purchaser, including in such term a mortgagee and lessee; 2. A creditor. 3. A wife; 4. A legitimate child; and 5. A charity.

In American chancery practice, *A.* is the exercise of a right to designate the person or persons who are to take the use of real estate. The *A.* must be made by the person authorized, who may be any person competent to dispose of an estate of his own in the same manner, including a married woman, even though her husband may be the appointee; or an infant, if the power be simply collateral. If the appointment be made 'to and amongst' several, a fair allotment must be made to each. The effect of an *A.* is to vest the estate in the appointee, as if conveyed by the original donor.

**APPOMATTOX COURT-HOUSE**, ăp-pō-măt'toks: small village, county-seat of Appomattox co., Va.; 80 m. w. of Richmond, about 20 m. e. of Lynchburg; 3 m. n. of Appomattox Station, on the Norfolk and Western r.r. It is famous for the surrender, by Gen. Robert E. Lee, of the Confederate army of n. Va. to Gen. Grant, 1865, April 9, practically ending the civil war.

## APPORTION—APPOSITE.

**APPORTION**, *v.* *ăp-pôr'shŭn* [*F. apporportionner*; *mid. L. appor'tionārī*, to distribute equitably—from *L. ad*, to; *portionem*, a part]: to distribute in just portions; to give a share to; to divide; to assign. **APPOR'TIONING**, *imp.* **APPOR'TIONED**, *pp.* *-shŭnd*. **APPOR'TIONMENT**, *n.* a dividing into shares or portions. **APPOR'TIONER**, *n.* one who.—**SYN.** of 'apportion': to allot; appoint; destine; divide; assign; share; distribute.

**APPORTIONMENT**, in Law: in the United States, the allowance made in the case of an incomplete performance of a contract; the allotment of their shares in a rent to the different parties indebted; and the determining, in the case of encumbered estates, of the amount which each of the several parties interested in the estate shall pay toward the removal, or in support of the burden of the incumbrance.

**APPORTIONMENT BILLS, CONGRESSIONAL**: acts of congress passed in accordance with the constitution, defining the number of representatives in congress allotted to each state—the number being assigned after each decennial census, in proportion to the total population. It is provided that the actual enumeration shall be made every ten years, that the number of representatives shall not exceed one for every 30,000, but that each state shall have at least one representative. From the organization of the govt. till 1830, the number of representatives had multiplied nearly three times; being 65 in 1789, and 240 in 1830. Till this time the allotment had increased from 1 member for every 30,000 pop. to 1 for every 47,700. In 1840 the relation was changed to 1 for every 70,680, each census increasing the ratio of divergence, until in 1900 it reached 1 for every 194,182 of pop., there being then 386 members. The rule generally followed has been based on an intention to have no more than 300 members, and the difference between this number and the actual figures has been caused mainly by accession of new states. The latest act of apportionment was approved 1901, Jan. 16, increasing the number of members by 29, the same to take effect 1903, Mar. 4. By the redistricting in the several states the increase of representation was as follows: Ala. 1, Ark. 1, Cal. 1, Colo. 1, Conn. 1, Fla. 1, Ill. 3, La. 1, Mass. 1, Minn. 2, Miss. 1, Mo. 1, N. J. 2, N. Y. 3, N. C. 1, N. D. 1, Penn. 2, Tex. 3, Wash. 1, W. Va. 1, Wis. 1. The states of Del., Ga., Id., Ind., Ia., Kan., Ky., Me., Md., Mich., Mont., Neb., Nev., N. H., O., Or., R. I., S. C., S. D., Tenn., Ut., Vt., Va., and Wyo. remained stationary. The principle applied in the case of the U. S. house of representatives is adopted in the several states in their apportionment for representation in their legislative bodies, and such apportionment usually follows the decennial period. See CONGRESS, UNITED STATES.

**APPOSITE**, *a.* *ăp'pō-zīt* [*L. appōsītus*, put or placed at or near—from *ad*, to; *positus*, placed or put]: well put in respect of time, place, or circumstances; suitable; well adapted to: in *bot.*, having similar parts; similarly placed;



## APPOSITION—APPREHEND.

placed, as side by side. AP'POSITELY, ad. -zīt-lī. AP'POSITENESS, n. fitness; suitableness. APPPOSITION, n. āp'-pō-zīsh'ŭn, the act of placing beside; in *gram.*, two nouns following each other in the same case, the latter explanatory of the former, or modifying it in some way.

APPPOSITION: a term in Grammar signifying the annexing of one substantive to another, in the same case or relation, in order to explain or limit the first, as *My brother, the physician; Thomas the Rhymer*. Whole sentences or clauses admit of A.; thus, 'Napoleon sought the way to India through Russia, a stroke of genius.' Sometimes a connecting word is used where logical propriety would require A.; as, *the city of London, for the city London*.

APPRAISE, v. āp-prāz' [F. *apprécier*, to value; mid. L. *appretīārē*, to put a price upon—from L. *ad*, to; *prētium*, a price]: to put a price upon; to fix the value of an article for the purpose of sale. APPRAISING, imp. APPRAISED', pp. -prāzd'. APPRAIS'ER, n. one whose business it is to put values on articles that are to be sold. APPRAISEMENT, n. āp-prāz'mēnt, a valuation put on an article.—SYN. of 'appraise': to appreciate; estimate; esteem; value.

APPRAISEMENT: the valuation of goods or real estate by persons appointed by competent authority and called appraisers. Such valuation is ordered by law or by the courts, in the case of property of persons dying intestate, of insolvents and of others. Where private property is taken for public use, an A. is made of it, that the owner may be paid its just value. A. is also often a matter of agreement in the private settlement of disputed questions, in purchase and sale, and in forming co-partnerships, or in making contracts for service, where property, real or personal, is a factor. In collecting the customs at ports of entry, the appraiser and his deputies are officials charged with examining goods imported and dutiable, with a view to prevent under-valuation and to prescribe the proper classification for charging the legal duty.

APPRECIATE, v. āp-prē'shī-āt [mid. L. *appre'tiārī*, to value at a price—from L. *ad*, *prētium*, a price: F. *apprécier*: see APPRAISE, from same root-words]: to set a proper value on; to esteem rightly; in *Amer.*, to rise in value; to raise the value of. APPRE'CIATING, imp. APPRE'CIATED, pp. APPRECIABLE, a. āp-prē'shī-ā-bl, that may be properly valued; capable of being estimated. APPRE'CIABLY, ad. -blī. APPRECIATION, n. āp-prē'shī-ā'shŭn, the setting a value on; a just estimate of.—SYN. of 'appreciate': to appraise; estimate; esteem; value.

APPREHEND, v. āp-prē'hēnd' [F. *appréhender*—from L. *apprehēnd'ērē*, to seize or take hold of—from L. *ad*, to; *prehendo*, I seize or take]: to take hold of; to seize; to understand; to think on with fear. AP'PREHEN'DING, imp. AP'PREHEN'DED, pp. AP'PREHEN'DER, n. one who. AP'PREHEN'SIBLE, a. -sī-bl [L. *apprehensus*, seized or taken hold of]: that may be apprehended. AP'PREHEN'SION, n. -hēn'shŭn, the act of taking or seizing; the being able to understand; suspicion; fear. AP'PREHEN'SIVE, a. -sīv,

## APPRENTICE—APPROACH.

fearful; in expectation of evil. AP'PREHEN'SIVELY, ad. -siv-ly. AP'PREHEN'SIVENESS, n. the quality or state of being apprehensive.—SYN. of 'apprehend': to conceive; suppose; imagine; presume; assume; fear; dread; catch; arrest; detain; capture; understand; believe. See ARREST.

APPRENTICE, n. *ăp-prĕn'tis* [OF. *apprentis*; F. *apprenti*, a beginner—from *apprendre*, to learn: mid. L. *apprentic'iūs*, an apprentice—from L. *ad*, to; *prehendo*, I take]: one taken under a bond or indenture as a beginner or learner; a young person learning a trade or profession: V. to put under a master to learn a trade or profession. APPREN'TICING, imp. APPREN'TICED, pp. -tist. APPREN'TICESHIP, n. the service or condition of an apprentice.

APPRENTICE: one taken under bond or indenture as a beginner or learner. Apprenticeship exists at common law, but, in the United States, has been generally regulated by statute, on account of its liability to abuse. It is not binding upon an infant unless the contract be entered into by him, with the consent of the parent or guardian, or by the parent or guardian with his consent, such consent to be made a part of the contract. In a common indenture of apprenticeship the father is bound for the performance of the covenants by the son. This contract must be entered into, generally, by indenture or deed, and is to continue, if the A. be a male, only during minority, and if a female, only till she arrives at the age of eighteen. The law holds that the agreement entered into is binding upon the master equally with the A.; the former stands *in loco parentis* to the latter; that he is bound to treat the A. with kindness, and not ill-use him in any way, must watch over his general conduct and afford him a good example and good advice, and must so instruct him in his trade or vocation that, if he be diligent and capable, he can thoroughly learn it—although the master is not to be held accountable for failure because of incompetency. He cannot dismiss his A. without the consent of all the parties to the indenture, even though the A. should steal his master's property, or by reason of incurable illness become incapable of service, except by the sanction of some competent tribunal. Upon the death of the master, the apprenticeship is dissolved.

APPRESSED, a. *ăp-prĕst'* [L. *ap*, for *ad*, at or to; *pressus*, pressed, kept under]: in *bot.*, denoting leaves which are applied to each other, face to face, without being folded or rolled together.

APPRISE, v. *ăp-prīz'* [F. *appris*, learned, instructed—from L. *ad*, to; *prehendo*, I seize or take]: to instruct in the knowledge of a thing; to inform; to give notice of. APPRI'SING, imp. APPRISED', pp. -prīzd'. For APPRISING, an obsolete term in Scotch law, see ADJUDICATION.

APPROACH, v. *ăp-prōch'* [F. *approcher*, to draw near—from mid. L. *apprōpriārē*, to approach—from L. *ad*, to; *prope*, near; *propriūs*, nearer]: to draw near; to come up to: N. a coming or drawing near; a path or avenue. APPROACH'ES, n. plu. -ēz, siege-works; means of access. APPROACH'ING, imp. APPROACHED, pp. *ăp-prōcht'*. AP-



## APPROACHES—APPROPRIATE.

**PROACH'ER**, n. one who. **APPROACH'ABLE**, a. -ă-bl, that may be reached; accessible. **APPROACH'MENT**, n. the act of coming near. **APPROACH'LESS**, a. that cannot be come near to or approached.—**SYN.** of 'approach': access; admittance; approximation.

**APPROACH'ES**: in military language, the sunken trenches or excavated roads constructed by besiegers. The siege camp being usually at a considerable distance from the fortress or city attacked, the soldiers would be exposed to imminent danger while hastening across a belt of open country to enter any breaches made by the large siege guns, were it not that concealed roads are first constructed along which they may approach. In some cases the A. are not actual trenches, but merely paths shielded by a piled-up wall of sand-bags, fascines, gabions, woolpacks, or cotton-bales. One of the most tremendous combinations of A. in the history of war was at the siege of Sebastopol in 1854-55; it comprised the digging of no less than 70 m. of sunken trench, and the employment of 60,000 fascines, 80,000 gabions, and 1,000,000 sand-bags, to protect the men working in the trenches and at batteries. See **SAP: SIEGE**.

**AP'PROBATE AND REP'ROBATE**: technical expression in the law of Scotland, which simply means, that no one can be permitted to A. and R.—that is, to accept and reject the same deed or instrument. It is applicable to wills, and other legal writings, deeds, or instruments; and is analagous to election (q.v.).

**APPROBATION**, n. etc.: see under **APPROVE**.

**APPROPRIATE**, v. ăp-prō'pri-ăt [L. *appro'priātus*, made proper or peculiar to one's self—from *ad*, to; *proprius*, private, one's own: F. *appropriier*, to appropriate]: to apply to one's own use; to set apart for a particular use; to claim or use as by right: **ADJ.** limited or set apart to a particular person or use; fit; suitable. **APPRO'PRIATING**, imp. **APPRO'PRIATED**, pp. **APPRO'PRIATENESS**, n. peculiar fitness; suitability. **APPRO'PRIATELY**, ad. -lī. **APPRO'PRIATION**, n. -shŭn, the act of setting apart for a particular use or purpose; the setting aside of a benefice for the use of some spiritual foundation, as for a college or chapter. **APPRO'PRIA'TOR**, n. one who holds an appropriated benefice. **APPRO'PRIABLE**, a. -ă bl, that may be appropriated or set apart. **APPRO'PRIATIVE**, a. -pri-ă-tiv, that appropriates.—**SYN.** of 'appropriate, v.': to usurp; arrogate; assume; ascribe; claim; exercise; annex;—of 'appropriate, a.': peculiar; particular; suitable.

## APPROVE—APPROXIMATION.

**APPROVE**, v. *ăp-prôv'* [F. *approuver*, to approve—from L. *approbārē*, to favor—from L. *ad*, to; *probo*, I prove or test; *prōbus*, good]: to be pleased with as good; to pronounce sufficient; to like; to commend. **APPROVING**, imp. **APPROVED'**, pp. *-prôcd'*. **APPROVINGLY**, ad. *-lĭ*. **APPROVER**, n. one who approves; a criminal who gives evidence against his accomplices; one who makes trial. **APPROVE'MENT**, n. approbation; evidence of an approver. **APPROBATION**, n. *ăp-prô-bā'shŭn*, the act of approving; commendation; expression of approval or satisfaction with. **APPROBATIVE**, a. *ăp-prô-bā'tĭv*, or **APPROBATORY**, a. *ăp-prô-bā'tēr-i*, containing or implying approbation. **APPROBATIVELY**, ad. *-lĭ*. **APPROBATIVENESS**, n. in *phren.*, the love of approbation. **APPROVABLE**, a. *ăp-prô-vă-bl*, that merits approval. **APPROVABLENESS**, n. **APPROVAL**, n. *ăp-prô-văl*, approbation.—**SYN.** of 'approbation': approval; concurrence; consent; liking; sanction; proof;—of 'approve': to praise; applaud; commend; extol; confirm.

**APPROVER**, or **PROVER**, in the Law of England: an accomplice in the perpetration of a crime who has been admitted to give evidence against the prisoner.

In the United States the term **A.** is not known in law: the legal designation is **ACCOMPLICE**; and accomplices are admitted to give evidence for the prosecution, or, as it is said, to become *state's evidence*, upon an implied promise of pardon, on condition of their making a full and fair confession of the whole truth. The testimony of an accomplice is in all cases, however, regarded with just suspicion; and, unless his statement is corroborated in some material part by unimpeachable evidence, the jury are usually advised by the judge to acquit the prisoner; and if the accomplice, after having confessed the crime, and being admitted as *state's evidence*, does not satisfy the condition on which he was so received by failing to give full information without equivocation, reservation, or fraud, he then forfeits all claim to protection, and may be tried, convicted, and punished on his own confession.

**APPROXIMATE**, v. *ăp-prôks'ĭ-măt* [L. *approx'imātus*, brought near—from *ad*, to; *prox'imus*, next, nearest]: to come near; to approach; to cause to approach. **ADJ.** nearest to or next; nearly approaching accuracy. **APPROXIMATING**, imp. **APPROXIMATED**, pp. **APPROXIMATION**, n. *-shŭn*, a near approach; an advancing near; a continual approach nearer and nearer to a result. **APPROXIMATELY**, ad. *-lĭ*, with a near approximation. **APPROXIMATIVE**, a. *-tĭv*, that approaches closely.

**APPROXIMATION**: term in mathematical science designating such calculations as are not rigorously correct, but approach the truth near enough for a given purpose. Thus in logarithmic and trigonometrical tables nearly all the numbers are mere approximations to the truth. The calculations of astronomy generally are of this nature. Even in pure mathematics there are parts in which approaches to the truth, by means of interminable series, are all we are able



to gain. The solution of equations beyond the fourth degree can be got only by A.

APPUI, *āp-pwē* [Fr.]: a stay or support. In military tactics, the *points d'appui* are such parts of the field of battle as are suited to give support or shelter. As the wings of an army (like the extreme sides of a chess-board) are the weakest points of resistance to attack, they especially require support or protection, and are placed, when it is possible, in localities which serve to obstruct the attacking forces. Lakes, morasses, woods, streams, and steep declivities may thus serve as *points d'appui*.

APPULEIUS, or, less properly, APULEIUS, *āp-pū-lē'yūs*: satirical writer of the 2d c.; b. Madaura, in Africa, where his father was a magistrate, and a man of large fortune. A. studied first at Carthage, which at that time had high reputation as a school of literature. Afterwards he went to Athens, where he entered keenly upon the study of philosophy, displaying a special predilection for the Platonic school. The fortune bequeathed to him at his father's death enabled A. to travel extensively. He visited Italy, Asia, etc., and was initiated into numerous religious mysteries. The knowledge which he thus acquired of the priestly fraternities, he made abundant use of afterwards in his *Golden Ass*. His first appearance in literature arose from a lawsuit. Having married a middle-aged lady, named Pudentilla, very wealthy, but not beautiful, he drew upon himself the malice of her relations, who desired to inherit her riches, and who accused the youth of having employed magic to gain her affections. His defense (*Apologia*, still extant), spoken before Claudius Maximus, proconsul of Africa, was an eloquent and successful vindication of his conduct. After this he seems to have given zealous attention to literature and public oratory, in both of which he attained great eminence. He was so extremely popular that the senate of Carthage, and other states, erected statues in his honor.

The *Golden Ass*, the work by which his reputation has survived, is a romance or novel, whose principal personage is one *Lucian*, supposed by some, though on insufficient evidence, to be the author himself. It is generally understood to have been intended as a satire on the vices of the age, especially those of the priesthood, and of quacks or jugglers affecting supernatural powers, though Bishop Warburton, and other critics, fancy they can detect in it an indirect apology for paganism. Its merits are both great and conspicuous, as are also its faults. Wit, humor, satire, fancy, learning and even poetic eloquence abound, but the style is disfigured by excessive archaisms, and there is a frequent affectation in the metaphors, etc., which proves A. to have been somewhat artificial in his rhetoric. The most exquisite thing in the whole work is the episode of Cupid and Psyche (imitated by La Fontaine). It is supposed to be an allegory of the progress of the soul to perfection. Besides the *Apologia* and *Golden Ass*, we have from the pen of A. an *Anthology* in four books. a work on the Dæmon of

Socrates, one on the doctrines of Plato, one on *The Universe*, etc. A considerable number of his works are lost. The most recent and careful edition of the whole works of A. is that pub. Leipsic, 1842, by G. F. Hildebrand. The *Golden Ass* was translated into English by T. Taylor (1822), and again by Sir G. Head (1851). An English version of the works of A. was pub. London, 1853.

APPULSE, n. *ăp-pŭls'* [L. *appul'sus*, driven to or towards—from *ad*, to, at; *pulsus*, pushed, struck]: the act of striking against; in *astron.*, near approach of two heavenly bodies to one another; also APPUL'SION, n. *-shŭn*. APPUL'SIVE, a. *-siv*, striking against. APPUL'SIVELY, ad. *-siv-lŭ*.

APPURTENANCE, n. *ăp-pér'tě-năns* [OF. *apurtenance*; F. *appartenance*, an appendage: mid. L. *appartenēn'tiă*, anything protected as one's own—from L. *ad*, to; *pertin'ēō*, I pertain or belong]: that which belongs to something else; an adjunct; an appendage. APPUR'TENANT, a. joined to, or belonging to. See APPERTAIN.

APRAXIN, *â-prâk'sin*, FEODOR MATVAYEVICH, Count of: 1671–1728, Nov. 10: distinguished Russian admiral. When hardly twelve years of age, he entered the service of Peter the Great, who formed a great attachment for him, which lasted during the whole life of the monarch. In 1699, he took part in the first maneuvers of the Russian fleet at Taganrog on the Sea of Azof. After 1700 he became the most powerful person at the court of the czar, who made him chief-admiral of the Russian navy, of which, in fact, A. may be considered the creator. While Peter was fighting the Swedes in the n., A. was building war-vessels, fortresses, and wharfs in the s. In 1707, he was appointed pres. of the admiralty; in 1708, he defeated the Swedish general, Lübecker, in Ingermannland, and saved the newly-built city of Petersburg from destruction; in 1710, he captured the important town of Viborg, in Finland; and in 1711, commanded in the Black Sea during the Turkish war. The following year he returned to the n.; and in 1713, with a fleet of 200 vessels, he sailed along the coast of Finland, took Helsingfors and Borgo, and defeated the Swedish fleet. The result of his great successes was, that at the peace of Nystadt, 1721, Russia obtained some most valuable advantages, being confirmed in her possession of Finland, just conquered, and of Esthonia. In spite of his brilliant reputation, however, he twice suffered an apparent eclipse of imperial favor. In 1714–15, he was charged with embezzlement, tried, and condemned to pay a fine; and a few years later was denounced by Peter himself as 'an oppressor of the people,' and again condemned to pay a fine; but his services were too useful to be dispensed with, and in both instances the czar neutralized the effect of the condemnation, by conferring upon him additional riches and dignities. In 1722, he accompanied Peter in his Persian war, and was present at the siege of Derbend. His last naval expedition was in 1726, when he repaired with the Russian fleet to Revel, to defend that place against an expected attack by



## APRICOT.

the English. He died at Moscow, in the 57th year of his age.

**APRICOT**, n. *ā'pri-kōt* [Sp. *albaricoque*—from Ar. *albirkouk*: Pers. *barkuk*, a peach, of which L. *præcoc'ia*, Gr. *praikōk'ia*, seems to be a mere adaptation: F. *abricot*]: old spelling **APRICOCK**: (*Prunus Armeniaca*): a species of the same genus with the PLUM (q.v.): native of Armenia, and of the countries eastward to China and Japan; a middle-sized tree of 15–20, or even 30 ft. high, with ovate, acuminate, and cordate, smooth, doubly-toothed leaves on long-stalks; solitary, sessile, white flowers which appear before the leaves, and fruit resembling the peach, roundish, downy, yellow, and ruddy on the side next the sun, with yellow flesh. The A. was brought into Europe in the time of Alexander the Great, and since the days of the Romans has been diffused over all its western countries. It has been cultivated in England since the middle of the 16th c. The A. is nearly as hardy as the ordinary varieties of the peach, but in order to prevent a too early starting of the buds in spring, the tree should have a n. rather than a s. exposure. The soil should be deep and rather dry; if overlying an impervious subsoil it should be underdrained. Varieties are propagated usually by budding (q.v.), though in the nursery, grafting (q.v.) is sometimes done. In warm climates A. and peach stocks are often used, but plum stocks are preferred for cold regions. The A. ripens several weeks earlier than the peach. It is particularly subject to attacks of the curculio (q.v.). There are about 20 good varieties. Apricots split up, having the stone taken out, and dried, are brought from Italy as an article of commerce, in particular from Trieste, Genoa, and Leghorn: in the s. of France, also, they are an article of export in a preserved and candied state. Dried apricots from Bokhara are sold in the towns of Russia, the kernels of which are perfectly sweet like those of the sweet almond. The kernels are sweet in some kinds, and bitter in others—the bitterness being probably more natural, and the sweetness, as in the almond, the result of cultivation. Generally speaking, the kernels may be used for the same purposes as almonds. From the bitter kernels, which contain prussic acid, the *Eau de noyaux* is distilled in France. The charred stones yield a black pigment similar to Indian ink. The wood of the tree is good only for the purposes of the turner.

The **BRIANÇON A.** (*Prunus Brigantiaca*), very much resembles the common A. The fruit is glabrous. It is found in Dauphiné and Piedmont. At Briançon, an oil, called *Huile de marmotte*, is expressed from the seeds.

The **SIBERIAN A.** (*P. Sibirica*), also is very like the common A., but smaller in all its parts. The fruit is small. It is a native of Siberia, especially of the s. slopes of the mountains of Dahuria.

The A. PLUM is an excellent kind of plum, much cultivated in some parts of France, and which, preserved in sugar, dried, and packed in shallow boxes, forms a considerable article of trade.

## APRIL—APRON.

APRIL, n. *ā'prīl* [L. *aprīlis*—from *aper'īō*, I open: F. *avril*: Sp. *abril*: It. *aprile*]: the fourth month of the year. The Romans named the month thus because it was the season when the buds began to open: by the Anglo-Saxons it was called Ooster or Easter-month; and by the Dutch Grass-month. APRIL-FOOL, one deceived in some humorous and ludicrous way on the 1st of April, as being sent on an absurd errand. The custom is perhaps a travesty of the sending hither and thither of the Saviour from Annas to Caiaphas, and from Pilate to Herod, because during the middle ages this scene in Christ's life was made the subject of a miracle-play (q.v.) at Easter, which occurs in the month of A. It is possible, however, that it may be a relic of some old heathen festival. The custom, whatever its origin, appears to be universal throughout Europe. In France, one thus imposed upon is called *un poisson d'Avril* (an A. fish). In England, such a person is called an A. fool; in Scotland, a gowk. Gowk is the Scotch for the cuckoo, and also signifies a foolish person. The favorite jest in Britain is to send some one upon an errand for something grossly nonsensical—as for pigeon's milk, or the history of Adam's Grandfather; or to make appointments which are not to be kept; or to call to a passer-by that his latchet is unloosed, or that there is a spot of mud upon his face. It is curious that the Hindus practice precisely similar tricks on the 31st of March, when they hold what is called the Huli Festival.

A PRIORI, a. *ā'prī-ōr'ī* [L. *a*, from; *prior*, former]: at first sight; prior to investigation; applied to reasoning which rests on general notions or ideas, and is independent of experience; the correlative of A POSTERIORI, the one implying the *cause*, the other the *effect*. The argument *a priori* is a mode of reasoning by which we proceed from the antecedent *cause* to the consequent *effect*, or from anticipation rather than from experience: mathematical proofs are examples of *a priori* reasoning. The argument *a posteriori* is the opposite, and reasons from the *effect* to the *cause*, from the individual case to the law, or generally from experience and not from anticipation. A predilection for one or the other of these forms of reasoning forms one of the most important distinctions among schools of philosophy. Plato may be taken as typical of the A-P. school, Locke and Bacon of the other. A-P. philosophy claims for its conclusions the character of necessary truths, and denies that there can be *a posteriori* proof of anything, that kind of reasoning furnishing only a confirmation or verification. The opposite school maintain that the general notions or principles on which A-P. reasoning rests are themselves the results of experience, and that, therefore, all truth rests really on *a posteriori* grounds.

APRON, n. *a'pŭrn*, or *ā'prŏn* [OF. *naperon*, a large cloth: F. *nappe*, table-cloth—from L. *mappa*, a table-napkin]: a made-up piece of cloth or leather worn in front; a covering, as of lead or zinc. A. of a cannon, a piece of sheet-lead which covers the touch-hole, tied by two pieces of white rope. A. in ship-building, a piece of curved timber fixed behind the



## APROPOS—APSE.

~~lower~~ part of the stem, and just above the foremost end of the keel; its chief use is to fortify the stem, and connect it more firmly with the keel. The name A. is given also to the plank-flooring raised at the entrance of a dock, a little higher than the bottom, to form an abutment against which the gates may shut. APRONED, a. *ā'pründ*, wearing an apron. A'PRON-MAN, n. a man who wears an apron; a workman.

APROPOS, ad. *ăp'rō-pō'* [F. *à propos*]. to the purpose, seasonably.

APSE, n. *ăps*, or APSIS (q.v.) *ăp'sis*; APSIDES, n. plu. *ăp'si-dēz*: semicircular recess at the east end of the choir, or chancel, in Romanesque or what are often called Anglo-Saxon or Anglo-Norman churches; a dome-roofed recess in a building; the arched roof of a room. The curious origin of this peculiar termination to the choir of a church has been clearly established by recent German writers. It is well known that the heathen structure from which the early Christians borrowed the form of their churches was not the temple, but the basilica or public hall which served at once for a market-place and a court of justice. The basilica, for the most part, was a parallelogram, at one of the shorter sides of which, opposite to the entrance, there was a raised platform destined for the accommodation of persons engaged in and connected with the distribution of justice. This portion of the building was the prototype of the rounded choir, to which the name of A. was given, and which is still to be



Church at Schwartz, Rheindorf.

seen in many of the Rhenish churches. For the pretor's chair, which was placed in the centre of this semicircular

## APSIS.

space, the altar was substituted; and the steps which led to the seat from which he dispensed justice were destined henceforth to lead to the spot where the Fountain of all justice should be worshipped. Many A.'s are to be met with in English churches, an enumeration of which will be found in Parker's *Glossary of Architecture*. On the continent the structure is much more frequent, and continued to be used to a much later period, indeed is still to be seen in almost every vilage along the Rhine. The lower part of the A. is there usually pierced by two or three round arched windows, often of irregular size and height, over which there is invariably an external gallery supported by pillars, in the form of which the rude idea of a Roman pillar is at once apparent; and the whole is joined to the end of the nave, which rises considerably above it, by a roof in the form of a segment of a cone. In larger churches there is a complete row of windows of the same rounded form, divided by pillars similar to those by which the gallery is supported, and under them frequently a line of arches of corresponding construction, while one or two small and irregular holes of the same form give a scanty light to the crypt beneath. Many of the smaller churches have no aisles; and the semicircular A. forms the termination of, or rather contains, the chancel. The more complete specimens of the style, however, such as the minster at Bonn, afford—with the exception of the transepts and the towers, which are later additions—about the most perfect examples to be found on this side of the Alps of the form of the Roman basilica, at first adapted to Christian uses. Several examples of the A. are to be seen



Church of Dalmeny.

in ecclesiastical structures in the United States, and the feature has been introduced with fine effect in library buildings, etc.

APSIS, n. *ăp' sīs*, or APSE, n. *ăps*, APSIDES, n. plu. *ăp' sī-dēz* [Gr. *hapsis*, a junction]: one of the two extreme points in the orbit of a planet—the one at the greatest, the other at the least distance from the sun. The term A. is also applied in the same manner to the two points in the orbit of a satellite—one nearest to, the other furthest from, its primary; corresponding, in the case of the moon, to the perigee and



apogee. A right line connecting these extreme points is called the line of A. In all the planetary orbits, this line has no fixed position in space, but makes a forward motion in the plane of the orbit, except in the case of the planet Venus, where the motion is retrograding. This fact in the orbit of the earth gives rise to the anomalistic year (q.v.). This advancing motion of the line of A. is especially remarkable in the orbit of the moon, where it amounts to  $40^{\circ} 40' 32'' \cdot 2$  annually, an entire revolution thus taking place in rather less than nine years.

APT, a. *āpt* [F. *apte*—from L. *aptus*]: ready; quick; fit; suitable. APT'LY, ad. *-lī*. APT'NESS, n. readiness or quickness in learning; fitness. APTITUDE, n. *āp'tī-tūd* [mid. L. *aptitudo*, fit time, fitness]: a disposition for; readiness; docility.—SYN. of 'apt': ready; prompt; clever; fit; meet; suitable; quick; liable; disposed; qualified; inclined.

APTEROUS, a. *āp'tēr-ūs* [Gr. *a*, without; *ptēron*, a wing]: without wings. APTERA, n. *āp'tēr-ā*, a division of insects in which the adult is destitute of wings, as in the lice. In the Linnæan system, the *Aptera* form an order of insects; but more important distinctive characters being found to belong to the insects included in it, it is no longer retained as an order or principal division in the best entomological systems.

APTERYX, n. *āp'tēr-īks*: a genus of cursorial birds peculiar to New Zealand, which form a family of the group to which the ostrich-like birds belong, as also the extinct moas and *æpyornis*. The beak is long and slender; the legs and thighs strong; the claws of the three anterior toes are used as weapons of offense. The wings are merely rudimentary, and concealed by the loose, almost hair-like plumage. The feathers of the dorsal plumage are lanceolate, and composed externally of long, disunited filaments, the downy portion towards the root much developed. The wings have not the accessory plumage so highly developed in some of the struthious birds. The skin is very tough.



*Apteryx Australis*.

Four species have been described; the largest (*Apteryx haastii*) stands about 3 ft. high; the smallest (*A. Mantelli*) is about 23 in. from tip of beak to toe. The other two species are

## APTITUDE—APURIMAC.

*A. Australis* (of which perhaps *A. Mantelli* is only a variety) and *A. Oweni*. Worms are the A.'s chief food, in search of which it deftly insinuates its flexible beak into the soft earth. The A. also eats insects, grubs, and some berries. It is nocturnal in its habits, and its nest is at the base of a hollow tree, or in deep holes in the ground. The native name is *kiwi-kiwi*.

APTITUDE, APTLY, APTNESS, etc.: see under APT.

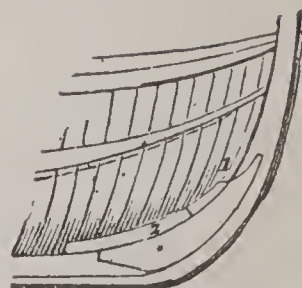
APTOTE, *n.* *äp'tôt* [Gr. *a*, without; *ptōtos*, that can, or is wont to fall]: an indeclinable noun.

APULIA, *ä-pū'li-a*: part of ancient Iapygia (so named after Iapyx, son of Dædalus); now includes the s.e. part of Italy as far as the promontory of Leuca, and also the extreme peninsula of Calabria. Here, in ancient times, lived three distinct peoples—the Messapians or Salentini, the Peuceni, and the Dauni or Apulians. According to old Latin traditions, Daunus, king of the Apulians, when banished from Illyria, settled in these parts of Italy. Later traditions say that Diomedes, the Ætolian, with several other heroes returning from the Trojan war, came to Italy, and, in his war with the Messapians, was assisted by Daunus, but was afterwards deprived of his territory, and put to death. Roman poetry has preserved these old names; but in history, no mention is made of any king of A., though we find the names of its principal cities—Arpi, Luceria, and Canusium. The second Punic war was for some time carried on in A. In the present day, A. (now styled PUGLIA) is merely the name of a compartment, which has no political meaning, and which includes the three provinces of Capitanata or Foggia, Bari, and Terra di Otranto or Lecce. It is but a shadow of its former self, in the time of the Greek colonies, under Roman dominion, or even under the Normans, who took possession of it, 1043. The towns are depopulated, industry has disappeared, and commerce, once flourishing, has passed away. Agriculture is in a very low condition, and the few roads are infested by banditti. See Gregorovius' *Apulische Landschaften* (2d ed., Leips. 1880).

APURA, *ä-pô'rā*: navigable river of Venezuela, which rises near the w. boundary among the e. Cordillera, and flows nearly 1,000 m. eastward, past the towns of Nutrias and San Fernando, till it falls into the Orinoco, in lat. 7° 40' n. and long. 66° 45' w.

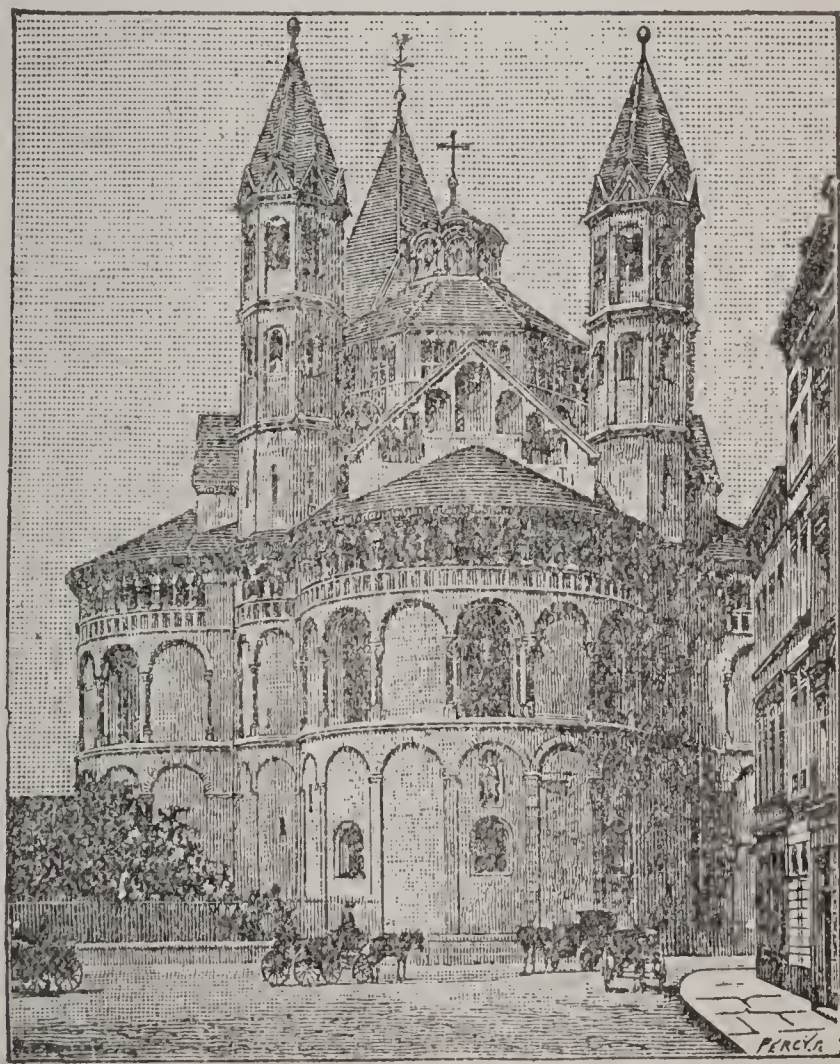
APURIMAC, *ä-pô-rē-māk'*: river of Peru, which, after a course of 500 m., assumes the name, first, of Tambo, and then of Ucayali (q.v.), which finally joins the Tangaragua to form the Amazon. The A. proper rises to the n.w. of the great table-land of Lake Titicaca, receiving from it, however, no portion of its waters. Among the tributaries of the Amazon, it is one of the most southerly; while among them, it approaches perhaps the nearest to the Pacific. The A., from its source in lat. 16° s., drains the e. face of the Andes through about 5°, till it changes its name, as above, in 10° 45' s., meanwhile receiving several considerable affluents, especially the Villcamayo, from the opposite





Apricot (*Prunus armeniaca*).

1, Apron ; 2, Lower Apron.



Apse.—The Church of the Apostles, Cologne. (From a Photograph.)

## APUS—AQUA.

quarter. The A. and its feeders partake of the nature rather of mountain torrents than of navigable rivers; and even for travelling by land, their rocky and rugged banks are always difficult, and often impracticable. The valleys vary in climate and productiveness according to their elevation. The upper ones yield wheat and barley, and most of the fruits of Europe; while the lower, or at least the lowest ones, abound in sugar and cotton, plantains and pine-apples. The basin of the A., as a whole, is said to be the finest part of Peru, and to contain the largest proportion of native population—the best specimens apparently of the aboriginal civilization.

APUS, n. *ā'pūs* [Gr. *a*, without; *pous*, a foot]: a genus of the *phyllop'oda*, having 60 pairs of apparent feet, all but two foliaceous or leaf-like, often found in great numbers in pools and ditches; a bird so called because it did not use its feet; a martinet or martin, a bird with very small feet; in *astron.*, a constellation near the s. pole.

APYRENUS, n. *ā'pī-rē'nūs* [Gr. *a*, without; *pūrēn*, a seed]: in *bot.*, fruit which produces no seeds, as cultivated varieties of the orange, pine-apple, etc.

APYREXY, n. *ā'pīr-ēk'sī* [Gr. *a*, *pūres'so*, I have fever—from *pur*, fire]: the intermission of a fever. APYROUS, a. *ā'pīr-ūs*, fire-proof; incombustible; that sustains a strong heat without alteration. APYRETIC, a. *ā'pīr-ēt'ik*, without fever.

AQUA, n. *ā'kwă* or *ăk'wă* [L. *aqua*, water]: a word now much used as part of a compound. AQUAFORTIS, *för'tis* [L. *fortis*, strong]: strong water; a powerful acid, so called by the alchemists, now named *nitric acid*. AQUA MARINA, *-mă-rē'nă* [L. *mărē*, the sea]: sea-water; applied to the precious stone, beryl, from its color. AQUA MARINE, n. *ă'kwă mă-rēn'*, the varieties of the *beryl* (q.v.) which are green or blue—the yellow variety is strictly called beryl; some green and blue varieties of topaz also have been thus called. AQUA REGIA, *-rē'jī-ă* [L. *regiūs*, royal]: royal water; a mixture of nitric and muriatic acids; a dissolvent of gold, the king of the metals; now called *nitro-muriatic acid*. AQUA REGINÆ, literally *queen's water*, mixture of concentrated sulphuric acid (oil of vitriol) and nitric acid, or of sulphuric acid and nitre. Either mixture evolves much fumes, and may be used as a disinfectant, as similar mixtures are sold under the name of *everlasting disinfectants*. AQUA VITÆ, *-vī'tē* [L. *vita*, life]: water of life; brandy or other ardent spirit. During the alchemical epoch, brandy or distilled spirits was much used as a medicine, was considered a cure for all disorders, and thought to prolong life; and as Latin was the learned tongue, this restorer of health and prolonger of life was called *aqua vitæ*. AQUATIC, a. *ă-kwăt'ik*, living in the water or much on it, as some fowls. AQUARELLE, n. *ăk'wâr-ël* [L. dim. of *aqua*, water]: a painting in water colors. AQUARIUM, n. *ă-kwă'rĩ ūm*, a glass case containing water, etc., for plants and creatures that live in water; any large building where such cases are kept and exhibited. AQUARIUS, n. *ă kwă'rĩ-ūs* [L. a water-carrier]: a sign of the zodiac. AQUA TINTA, *ă'kwa tĩn'ta*,



## AQUARIUM.

or AQUATINT, n. *ā'kwă-tînt* [L. *aqua*: It. *tinta*, a tint or dye—from L. *tingo*, I stain]: a mode of etching on copper, by which imitations of drawings in Indian ink, bistre, and sepia are produced. On a plate of copper a ground is prepared of black resin, on which the design is traced; a complicated series of manipulations with varnish and dilute acid is then gone through, until the desired result is attained. The process of A. has fallen into comparative disuse.

AQUARIUM: a tank or vessel containing either salt or fresh water, in which either marine or fresh-water plants and animals are kept in a living state. The name was formerly sometimes given to a tank or cistern placed in a hot-house, and intended for the cultivation of aquatic plants. The A., as now in use—originally called *Vivarium* or *Aquavivarium*, and intended chiefly for animals, depends in principle upon the relations discovered by science between animal and vegetable life, and particularly upon the consumption by plants, under the action of light, of the carbonic acid gas given forth by animals, and the consequent restoration to the air or water in which they live of the oxygen necessary for the maintenance of animal life. The A. must therefore contain both plants and animals, and in something



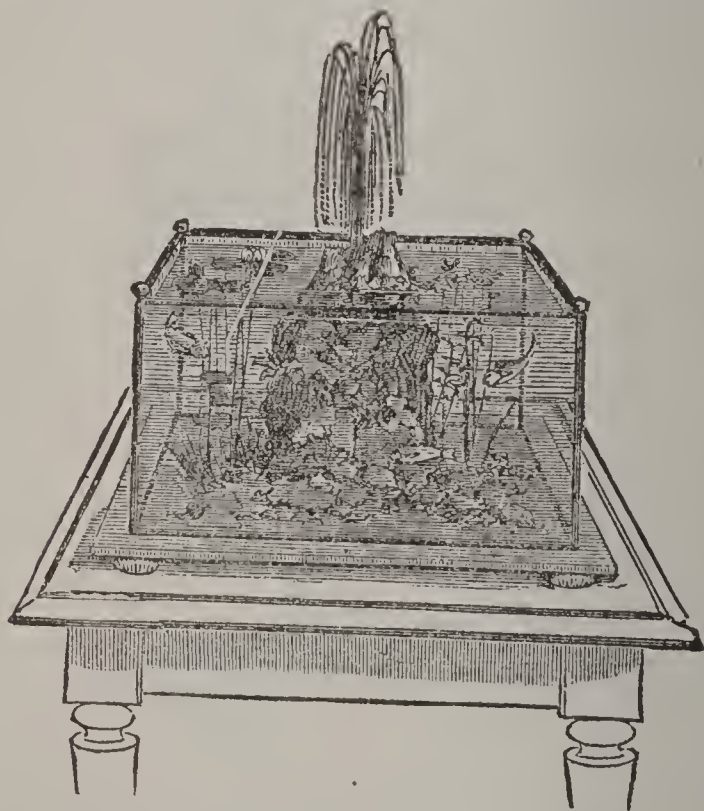
Simple form of an Aquarium.

like a proper proportion. Zoophytes, Annelides, Mollusca, Crustacea, and fishes may thus, with due care, be kept in health, and their habits observed. The water must be frequently *aerated*, which can be accomplished by taking up portions of it and pouring them in again from a small height. The fresh-water A. is frequently provided with a fountain, which produces a continual change of water; but even where this is the case, the presence both of plants and animals is advantageous to the health of both. When sea-water cannot easily be procured for the marine A., a substitute may be made by mixing with rather less than 4 quarts of spring water  $3\frac{1}{2}$  ounces of common table-salt,  $\frac{1}{4}$  ounce of Epsom salts, 200 grains troy of chloride of magnesium, and

## AQUARIUM.

40 grains troy of chloride of potassium. With care, the water may be kept good for a long time. No dead animal or decaying plant must be permitted to remain in it. Salt water, artificially prepared, is not fit for the reception of animals at once; but a few plants must first be placed in it, for which purpose some of the green algæ, species of *Ulvæ* or *Conferva*, are most suitable. The presence of a number of molluscos animals, such as the common periwinkle, is necessary for the consumption of the continually growing vegetable matter, and of the multitudinous spores (seeds), particularly of confervæ, which would otherwise soon fill the water, rendering it greenish or brownish, and untransparent, and which may be seen beginning to vegetate everywhere on the pebbles or on the glass of the tank. In a fresh-water A., molluscos animals of similar habits, such as species of *Lymnæa* or *Planorbis*, are equally indispensable. For large aquaria, tanks of plate glass are commonly used; smaller ones are made of bottle-glass or of crystal.

Blennies, gobies, and gray mullets are perhaps the kinds



Aquarium with Fountain for Aerating.

of fish most common in marine aquaria; gold-fishes, sticklebacks, and minnows are frequent in fresh-water ones. These have the advantage of being more easily kept in good health than many other kinds, and a further recommendation is found in their small size, and in the fine colors of the gold-fish. The nests of sticklebacks are a subject of unfailing interest. Crabs of various species, and actiniæ or sea-anemones, are very generally among the larger inmates of the A. Serpulæ contribute much both to its interest and beauty, as they spread out their delicate and finely-tinted branchiæ from the mouth of their shelly tube. and withdraw within

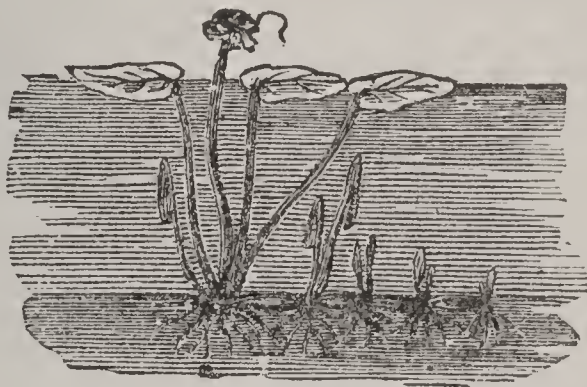


## AQUARIUS—AQUATIC.

it, quick as thought, upon the slightest disturbance. Balani or acorn-shells are very beautiful objects when they are seen opening their summit-valves, and rapidly stretching out and retracting their little nets. Even periwinkles and limpets are interesting, particularly when they are watched by the aid of a magnifying-glass, as they feed upon the spores of the confervæ which have just begun to vegetate on the glass of the A., moving slowly along, with continual opening and shutting of the mouth, like cows at pasture, when the structure and motions of their mouths and the singular beauty and brilliancy of colors may be observed. The use of a good magnifying lens adds greatly to the interest of the A., and zoophytes of exquisite forms and colors may be watched in the actual processes of life. See WARDIAN CASES.

AQUARIUS, *ă-kwā'ri-ŭs*, the Water-bearer: the eleventh sign of the zodiac, through which the sun moves in part of the months of January and February. It is also the name of a zodiacal constellation, whose position in the heavens may be found by producing a line in a southerly direction through the stars in the head of Andromeda and the wing of Pegasus.

AQUATIC PLANTS and ANIMALS: those that live either wholly or partly in water. The term is very vaguely used, those plants being often called A. which grow in ponds, ditches, etc., although not only their inflorescence, but great part of their foliage, is above the surface of the water, as well as those which more completely belong to that element; and a similar latitude of meaning prevails with regard to animals. Few phanerogamous (or flowering) plants exist



Aquatic plant.

entirely under water, although there are a few, like the common *Zostera marina*, or Grass-wrack, which do so, and produce even their flowers in that condition; others, of which the greater part of the plant is usually under water, produce their flowers upon, or considerably above, its surface, as those of the genera *Valisneria*, *Anacharis* (q.v.), etc. The leaves, as well as the flowers, of many float upon the water, of which the water-lilies furnish well-known and beautiful examples; while in *Ranunculus aquatilis*, that exquisite ornament of river margins, we have an instance of great diversity between the lower leaves which remain submersed, and the upper leaves which float. Of crypto-

## AQUATIC.

gamous plants, one great order, *Algæ*, is exclusively A., and these seem adapted to perform under water all the functions of their life. A. plants are, in general, of less compact structure than other plants, thus lighter and better adapted for rising in their growth towards the surface of the water; in order to which also some of the algæ, as may be seen in more than one of the most common sea-weeds, are provided with air-bladders of considerable magnitude. All this is the more necessary, as plants completely A. have generally little firmness of stem, and if their weight made them fall to the bottom would lie in a mass, as they do when withdrawn from the water, in which, however, they gracefully float, their flexibility of stem enabling them to adapt themselves to waves or currents which would destroy them if they were more rigid. So admirably are all things in nature harmonized.

Many animals, to a considerable extent A. in their habits, must not only breathe air, but are adapted for spending great part of their existence on dry land. Such are chiefly those that seek their food in the water. The peculiarities of structure by which they are fitted for wading, for swimming, for diving, and for remaining under water a longer time than other animals can, are very interesting and admirable. Even the fur of the beaver, the otter, the water-rat, and other animals of this description, is not liable to be drenched like that of other quadrupeds; and the plumage of water-fowls exhibits a similar peculiarity. The feet of many are webbed, so as to enable them to swim with great facility; and to this the general form, as in water-fowls, likewise exhibits a beautiful adaptation. The webbed feet in some, of which the habits are most thoroughly A., as seals, assume the character of a sort of paddle, admirably fitted for use in the water, but by means of which they can only move very awkwardly on land. The forms of whales and fishes are remarkably adapted for progression in water; while, instead of the limbs by which other vertebrate animals are enabled to move upon the land or to fly in the air, their great organ of locomotion is the tail, or rather the hinder part of the elongated body itself, with the tail as the blade of the great oar, which all the principal muscles of the body concur to move. Remarkable provision is made in A. animals of the higher vertebrate classes for the maintenance of the requisite animal heat, by the character of the fur or plumage; a purpose which the blubber of whales also most perfectly serves. In the colder-blooded animals, where no such provision is requisite, the structure of the heart is accommodated to the diminished necessity for oxygenation of the blood; and although reptiles in their perfect state must breathe air, many of them can remain long under water without inconvenience. Fishes, and the many other animals provided with branchiæ or gills, breathe in the water itself, deriving the necessary oxygen, which in their case is comparatively little, from the small particles of air with which it is mingled. They cannot subsist in water which has been deprived of air by boiling. Some A. insects carry down with them into the water



## AQUA TOFANA.

particles of air entangled in hairs with which their bodies are abundantly furnished.

A'QUA TOFA'NA: a poisonous liquid much talked of in the s. of Italy about the end of the 17th c. There is doubt as to its inventor, but it is ascribed to a Sicilian woman named Tofana, who lived first at Palermo, but was obliged, from the attention of the authorities having been attracted to her proceedings, to take refuge in Naples. She sold the preparation in small phials, inscribed 'Manna of St. Nicholas of Bari,' there being a current superstition that from the tomb of that saint there flowed an oil of miraculous efficacy in many diseases. The poison was especially sought after by young wives that wished a riddance of their husbands. The number of husbands dying suddenly in Rome about 1659 raised suspicion, and a society of young married women was discovered, presided over by an old woman named Spara, who had learned the art of poisoning from Tofana. Spara and four other members of the society were publicly put to death. Tofana continued to live to a great age in a cloister, in which she had taken refuge, but was at last (1709) dragged from it, and put to the torture, when she confessed having been instrumental to 600 deaths. According to one account she was strangled; but others affirm that she was still living in prison in 1730.

The A. T. is usually described as a clear, colorless, tasteless, and inodorous fluid; five or six drops were sufficient to produce death, which resulted slowly and without pain, inflammation, or fever; under a constant thirst, a weariness of life, and an aversion to food, the strength of the person gradually wasted away. It is even stated that the poison could be made to produce its effects in a determined time, long or short, according to the wish of the administrator—a notion generally prevalent in those ages respecting secret poisoning. The most wonderful stories are told of the mode of preparing this poison; for example, the spittle of a person driven nearly mad by continued tickling was held to be an essential ingredient. Later investigations lead to the belief that the A. T. was principally a solution of arsenic.

## AQUEDUCT.

**AQUEDUCT**, n. *ăk'wě-ďŭkt* [L. *aqua*, water, or *aquæ*, of water; *ductus*, led]: a course or channel made for conveying water either under or above ground. **AQUEOUS**, a. *ă'kwě-űs*, watery; pertaining to or arising from water. **A'QUEOUS'NESS**, n. the quality of being watery. **AQUEOUS HUMOR**, in *anat.*, the limpid fluid which occupies the space between the crystalline lens and the cornea. **AQUEOUS ROCKS**, in *geol.*, rocks whose material has been deposited by means of water, and which lie in strata, as opposed to unstratified or volcanic rocks.

**AQUEDUCT**: an artificial course or channel by which water is conveyed along an inclined plane. When an A. is carried across a valley, it is usually raised on arches, and where elevated ground or hills intervene, a passage is cut, or, if necessary, a tunnel bored for it. Aqueducts were not unknown to the Greeks; but there are no remains of those which they constructed, and the brief notices of them by Pausanias, Herodotus, and others, do not give any distinct notion of their character. The aqueducts of the Romans were among the most magnificent of their works, and the noble supply of water which modern Rome derives from the three now in use, of which two are ancient, gives the stranger a vivid conception of the vast scale on which the ancient city must have been provided with one of the most important appliances of civilization and refinement, when nine were employed to pour water into its baths and fountains.

The following are the names of the Roman aqueducts, chronologically arranged:

1. The *Aqua Appia*, begun by and named after the censor Appius Claudius abt. B.C. 313. It ran a course of between 6 and 7 m., its source being in the neighborhood of Palestrina. With the exception of a small portion near the Porta Capena, it was subterranean. No remains of it exist.

2. *Anio Vetus*, constructed abt. B.C. 273, by M. Curius Dentatus. It also was chiefly underground. Remains may be traced both at Tivoli and near the Porta Maggiore. From the point at which it quitted the river Anio, about 20 m. above Tivoli, to Rome, is about 43 miles.

3. *Aqua Marcia*, named after the pretor Quintus Marcius Rex, B.C. 145, had its source between Tivoli and Subiaco, and was consequently abt. 60 m. long. The noble arches which stretch across the Campagna for some 6 m. on the road to Frascati are the portion of this A. which was above ground.

4. *Aqua Tepula*, B.C. 126, had its source near Tusculum, and its channel was carried over the arches of the last-mentioned aqueduct.

5. *Aqua Julia*, constructed by Agrippa, and named after Augustus, B.C. 34. Like the Tepulan, it was carried along the Marcian Arches, and its source was also near Tusculum. Remains of the three last-mentioned aqueducts still exist.

6. *Aqua Virgo*, also constructed by Agrippa, and said to have been named in consequence of the spring which supplied it having been pointed out by a girl to some of Agrippa's soldiers when in search of water. The *Aqua Vergine*, as it



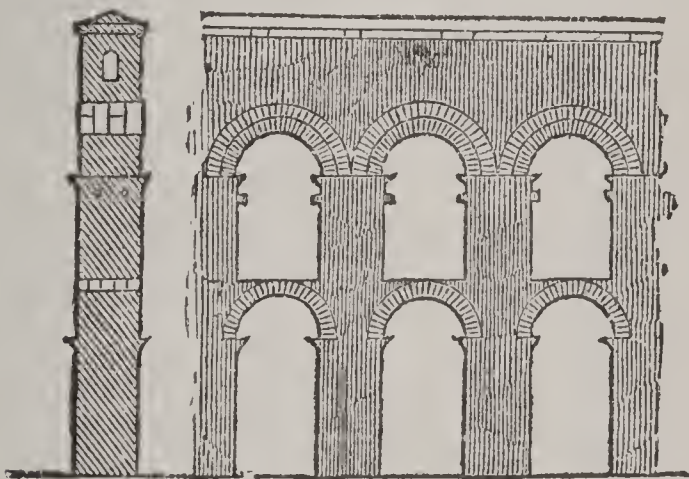
## AQUEDUCT.

is now called, is still entire, having been restored by the popes Nicholas V. and Pius IV., 1568. The source of the Aqua Virgo is near the Anio, in the neighborhood of Torre Salona, on the Via Collatina, and about 14 m. from Rome. The original object of this A. was to supply the baths of Agrippa; its water now flows in the Fontana Trevi, that of the Piazza Navona, the Piazza Farnese, and the Barcaccia of the Piazza di Spagna. The water of the Aqua Virgo is the best in Rome.

7. *Aqua Alsietina*, constructed by Augustus, afterwards restored by Trajan, and latterly by the popes. This A., now called the Aqua Paola, is situated on the right bank of the Tiber, and supplies the fountains in front of St. Peter's and the Fontana Paola on the Montorio. Its original object was to supply the Naumachia of Augustus, which was a sheet of water for the representation of sea-fights.

8. *Aqua Claudia*, commenced by Caligula, and completed by Claudius A.D. 51. A line of magnificent arches which formerly belonged to this A. still stretches across the Campagna, and forms one of the grandest of Roman ruins. It was used as a quarry by Sextus V. for the construction of the Aqua Felici, which now supplies the Fountain of Termini, and various others in different parts of the city.

9. *Anio Novus*, which was the most copious of all the Roman fountains, though inferior to the Marcia in the solidity of its structure; it was also the longest of the aqueducts, pursuing a course of no less than 62 m. By the two last-mentioned aqueducts, the former supply of water was doubled. In addition to the aqueducts already mentioned, there was the Aqua Trajana, which may, however, be regarded as a branch of the Anio Novus, and



Section.

Aqua Alexandrina.

several others of later construction, such as the Antoniana, Alexandrina, and Jovia, none of which were to be compared with the older ones in extent and magnificence.

Nor was it for the uses of the capital alone that aqueducts were constructed. The A. of Trajan, at Civita Vecchia, which conveys the water a distance of 23 m., and that in the vicinity of Marzana, near Verona, with others that might be mentioned, still attest the existence of aqueducts in

## AQUEDUCT.

the smaller towns of Italy in Roman times. Even during the unpromising period which succeeded, the habit of their construction was not abandoned, that of Spoleto having been built by the Lombard Duke Theodolapius in 604. The extraordinary A. by which the fountain at Siena is supplied is said to have occupied two centuries in building; and the modern A. of Leghorn, which is not unworthy of the Roman models after which it was designed, is surpassed in magnificence by that of Pisa, with its thousand arches. In the more distant provinces which fell under the Roman power, aqueducts were likewise constructed—at Nicomedia, Ephesus, Smyrna, Alexandria, Syracuse, and in many of the towns in Gaul and in Spain. At Merida there are the remains of two aqueducts, of one of which there are 37 piers still standing, with three tiers of arches. But the most magnificent structure of this class in Spain, is the A. of Segovia, in Old Castile, for which Spanish writers claim an antiquity beyond that of the Roman dominion; but which, there is reason to believe, belongs to the time of Trajan. At Evora, in Portugal, there is likewise an A. in good preservation, with a *castellum* or reservoir at its termination in the city, consisting of two stories, the lower one being decorated with pillars. But of all the provincial aqueducts, that at Nismes, in Provence, is at once the most remarkable and the best preserved. The following description of it, from Murray's Hand-book for France, gives a vivid idea of the very interesting class of works to which it belongs. 'It consists of three rows of arches, raised one above the other, each smaller than the one below it; the lowest of six arches, the centre tier of eleven, and the uppermost of thirty-five; the whole in a simple if not a stern style of architecture, destitute of ornament. It is by its magnitude, and the skilful fitting of its enormous blocks, that it makes an impression on the mind. It is the more striking from the utter solitude in which it stands—a rocky valley, partly covered with brushwood and greensward, with scarce a human habitation in sight, only a few goats browsing. After the lapse of 16 c., this colossal monument still spans the valley, joining hill to hill, in a nearly perfect state, only the upper part, at the northern extremity, being broken away. The highest range of arches carries a small canal, about  $4\frac{1}{2}$  ft. high and 4 ft. wide, just large enough for a man to creep through, still retaining a thick lining of Roman cement. It is covered with stone slabs, along which it is possible to walk from one end to the other, and to overlook the valley of the Gardon. The height of the Pont du Gard is 188 ft., and the length of the highest arcade 873 ft. Its use was to convey to the town of Nismes the water of two springs, 25 m. distant. . . . The conveyance of this small stream was the sole object and use of this gigantic structure, an end which would now be attained by a few iron water-pipes.' Neither the date nor the builder of the Pont du Gard is known with certainty, but it is ascribed to Agrippa, the nephew of Augustus; a conjecture which is rendered probable by the fact of his having restored the Appian, Marcian, and Anienian, and constructed the Julian



## AQUEOUS HUMOR—AQUEOUS ROCKS.

**A. at Rome.** The importance which the Romans attached to their aqueducts may be gathered from the fact that special officers, invested with considerable authority, and, like all the higher officials, attended by lictors and public slaves, were appointed for their superintendence. Under the orders of these 'guardians of the waters,' we are told that, in the time of Nerva and Trajan, about 700 architects and others were employed in attending to the aqueducts. These officials were divided into various classes, and known by different names, according as their duties related to the care of the course of the A., the *castella* or reservoirs at its termini, the pavement of the channel, the cement with which it was covered, and the like.

Among modern aqueducts (using the word in its restricted sense of a masonry construction for water-conveyance) the A. built to convey the waters of the river Eure to Versailles, France, is considered in many respects the finest in the world. It is about five-sixths of a m. long, more than 200 ft. high, and contains 726 50-ft. arches, divided into three rows. The subterranean A., which conducts water to the village of Arcueil, France, is 44,300 ft., or more than 8 m. long and 6 ft. high. A similar A., belonging to the Versailles system, is 11,760 ft. long. The great water-works which supply Marseilles include several aqueducts, of which the largest crosses the ravine of the river Arc, about 5 m. from Aix, and is 1,287 ft. long and 262 ft. high.

The Liverpool A. is one of the largest in the world; length 70 m., capacity 40,000,000 gallons per day. The supply is drawn from Lake Vyrnwy, Wales, whose available contents are over 12,131,000,000 gallons. Total cost of the work, about \$10,000,000.

For the Croton A. of New York, and for several others, see titles of various cities. See WATER SUPPLY.

**AQUEOUS HUMOR**, *ā'kwě-ŭs*: the fluid which occupies the space in the eye between the back of the cornea and the front of the lens, which, in foetal life, is divided into an *anterior* and *posterior* chamber by the *membra pupillaris* (q.v.), and in adult life by the iris. It consists of water, with, according to Berzelius, about a fiftieth of its weight made up of chloride of sodium and extractive matters held in solution.

Anatomists are not agreed as to the spring of this watery secretion, and are inclined to doubt the existence of a special secreting membrane, which used to be taken for granted. However, a layer of delicate epithelial cells, which exists at the back of the cornea (q.v.), is probably concerned in its formation. It is rapidly re-secreted if allowed to escape by any wound in the cornea, and in some cases is formed in such quantity as to cause dropsy of the eye (*hydrophthalmia*).

**A'QUEOUS ROCKS**: rocks, whose material has been deposited by means of water. In Geology, every layer which forms a portion of the solid crust of the earth is called a rock, whether its particles are incoherent, like soil or sand, or compacted together, like limestone or sandstone.

## AQUEOUS ROCKS.

In this wide sense, the rocks of the earth's crust are either igneous (q.v.) or sedimentary. These sedimentary rocks have an aqueous origin, with the exception of a very limited number, like drift-sand, which are brought into their present position by the action of the wind. Unlike the igneous rocks, whose particles have assumed their present form in the position they occupy, the materials of the A. R. have evidently been brought from a distance. They owe their origin to some older rocks, whose decomposition or destruction has afforded the materials. The parent rock can often be identified. Its distance is indicated by the condition of the materials, whether they are rounded and water-worn, or angular and shingly.

The agents now at work, and which have been active in past geological ages, rubbing down and transporting the materials from which these rocks are formed, are the following: 1. *The sea*, destroying the rocks and cliffs, and beaches which form its boundary, and carrying off the eroded materials to form new rocks below the level of the sea. 2. *Rivers*, including the action of their smallest tributary rills, and even of the drops of rain, for these abrade and carry off the almost imperceptible particles from the surface where they fall; and when united they form the rill with its suspended sediment, and these again unite to form the river, which in its course not only retains what it has got, but scoops up more from its own bed, and carries all to the sea or lake, to deposit it there as a new stratum. It is difficult to estimate the influence of this agency. Sir Charles Lyell calculates that the Nile annually deposits in the Mediterranean 3,702,758,400 cub. ft. of solid matter. 3. *Glaciers and icebergs*. These enormous moving masses of ice are not only loaded with rock-fragments, which are deposited as the ice melts, but are ever abrading the rocks over which they pass, and thus supply materials to form new layers. 4. Several stratified rocks have an evidently *organic origin*, such as chalk, and some limestones chiefly composed of animal remains, and coal consisting of vegetable carbon; but even these have been influenced in their formation by water so much as to justify us in classifying them with A. R. 5. The same remark applies to rocks which have been *precipitated from a fluid* with which the materials existed in chemical combination, as has been the case with beds of salt, gypsum, and calcareous tufa.

The result of these various actions is a series of rocks which, from their composition, may be classed as Arenaceous, Argillaceous, Calcareous, Carbonaceous, Saline, and Silicious. (See these titles.)

The arrangement of the A. R. depending on their different ages, is of more importance in modern geology than that depending on their internal constitution. When a section of the earth's crust is examined, it is found to be composed of a series of layers which have been produced in succession. Comparing this with sections in other districts, it is noticed that there is a regularity in the several parts; for beds of the same structure are found in different localities, and these occupy the same relative position to the



## AQUIFEROUS—AQUILA.

adjacent beds. A number of observations have shown that the crust of the earth is composed of a *regular* series of earthy deposits formed one after another, during successive periods of time. This general induction forms the basis of the following classification. For the description of the included strata we must again refer to the names of the different divisions:

I. QUATERNARY AND TERTIARY AGE—1. Superficial Deposits or Recent Period; 2. Pleistocene Period; 3. Pliocene or Upper Tertiary Period; 4. Miocene or Middle Tertiary Period; 5. Eocene or Lower Tertiary Period.

II. SECONDARY OR MESOZOIC AGE—6. Cretaceous Period; 7. Oolitic Period; 8. Triassic Period.

III. PRIMARY OR PALÆOZOIC AGE—9. Permian Period; 10. Carboniferous Period; 11. Devonian or Old Red Sandstone Period; 12. Silurian Period; 13. Cambrian Period.

AQUIFEROUS, a. *ā-kwīf'ér-ūs* [L. *aqua*, water; *fero*, I bear]: water-bearing; denoting vessels or canals by which water is distributed throughout an organism.

AQUIFOLIACEÆ, *āk-wī-fō'li-ā'sē-ē*: natural order of dicotyledonous or exogenous plants, of which the common holly (q.v.) is the best known example, and the only species that is a native of Europe. The order, however, contains more than one hundred species, the greater part of which are natives of America, and many of them belong to the tropical and subtropical parts of it. The species are all evergreen trees or shrubs, with simple, leathery leaves, and without stipules. The flowers are small and axillary, with 4-6 sepals, and a 4-6-parted corolla, into which the stamens are inserted, alternating with its segments. The ovary is fleshy and superior, with two or more cells, a solitary anatropal pendulous ovule in each cell, the cells generally becoming bony as distinct *stones* in the fruit, which is fleshy. The order is allied to *Rhamnaceæ*, *Celastraceæ*, and *Ebenaceæ*. The most interesting species belong to the genus *Ilex*, or HOLLY (q.v.).

AQUILA: see EAGLE.

AQUILA, *ā'kwē-lā*: cap. of the Italian province of the same name; on the Pescara, near the loftiest of the Apennines; a fortified town of the fourth class, though its citadel is its only strong point. A. was built by the emperor Frederic II. from the ruins of the ancient *Amiſternum*, a town of the Sabines, and the birthplace of Sallust the historian. In 1703, it was almost destroyed by an earthquake, in which 2,000 persons perished. A. is a bishop's see, has civil and criminal courts, and a lyceum, and is considered one of the best built towns in the kingdom. In 1841, much political disturbance took place here, and several of the inhabitants were imprisoned and put to death in consequence. Altogether, public feeling in this town and province is far more liberal than in most other parts of the kingdom. Pop. (1901) 21,188; province (1901) 396,629. (1891) 374,882.

AQUILA, *āk'wī-la*, PONTICUS: celebrated translator of the Old Testament into Greek, lived abt. 130; b. Sinope;

## AQUILARIACEÆ—AQUINAS.

said to have been a relation of the emperor Hadrian, and to have been first a Pagan, then a Christian, and finally a Jew; submitting in his last conversion to the peculiar religious ceremony of circumcision. His translation of the Old Testament—which appears to have been undertaken for the benefit of his Hellenized countrymen, was so *literal*, that the Jews preferred it to the Septuagint, as did also the Judaizing sect of Christians called Ebionites. Only a portion of the work remains, which has been edited by Montfaucon and others.

**AQUILARIACEÆ**, *āk'wī-lā-rī-ā'sē-ē*: natural order of dicotyledonous or exogenous plants, containing only about ten known species, all of which are trees with smooth branches of tough bark, natives of the tropical parts of Asia. The leaves are entire; the perianth leathery, turbinate, or tubular, its limb divided into four or five segments; the stamens usually ten; the filaments inserted into the orifice of the perianth; the ovary two celled, with two ovules; the stigma large; the fruit a 2-valved capsule, or a drupe. The order is chiefly interesting as producing the fragrant wood called **ALOES WOOD** (q.v.).

**AQUILEGIA**: see **COLUMBINE**.

**AQUILEJA**, *ā-kwē-lā'yā*, or **AGLAR'** (earlier, **Velia** or **Aquila**): small town in Austria, at the head of the Adriatic, 22 m. w.n.w. of Trieste. Pop. about 2,000. It is now sunk in utter insignificance, possessing no trade or public buildings of any note, except its cathedral; but in the time of the Roman emperors, it was one of the most important places n. of the metropolis. Its commerce was flourishing, for though 8 m. distant from the sea, vessels could reach it by canals connecting it with the rivers in its vicinity. It was both the central point of the transit trade between the n. and s. of Europe, and the key of Italy against the barbarians. Founded by a Roman colony, B.C. 181, it became a favorite residence of Augustus; and A.D. 168, was so strongly fortified by Marcus Aurelius, as to be considered the first bulwark of the empire on the n. It was called *Roma Secunda*, the Second Rome. Here the emperor Maximin perished; and in the vicinity Constantius lost his life in a battle against his brother Constans. When the town was destroyed by Attila (452), it had 100,000 inhabitants. It never recovered, although it received some ecclesiastical honors, but has continued slowly dwindling down into deeper obscurity and wretchedness. There are numerous remains of its former splendor. Councils were held at A. in 381, 558, 698, and 1184.

**AQUILINE**, a. *āk'wī-līn* [L. *aquila*, an eagle]: hooked or curved like the beak of an eagle.

**AQUILON**, n. *āk'wī-lōn* [F. *aquilon*—from L. *aquīlōnem*, the north wind]: the swift-flying thing; in *OE.*, the north wind; Boreas.

**AQUINAS**, *a kwī'nas*, **THOMAS**, or **THOMAS OF AQUINO**: 1224-74; b. in the castle of Rocca Secca; of the family of the Counts of Aquino, in the kingdom of Naples; one of the



## AQUINAS.

most influential of the scholastic theologians. He received the rudiments of his education from the Benedictine monks of Monte-Casino, and completed his studies at the Univ. of Naples. A strong inclination to philosophical speculation determined the young nobleman, against the will of his family, to enter (1243) the order of Dominicans. In order to frustrate the attempts of his friends to remove him from the convent, he was sent away from Naples, with the view of going to France; but his brothers took him by force from his conductors, and carried him to the paternal castle. Here he was guarded as a prisoner for two years, when, by the help of the Dominicans, he contrived to escape, and went through France to the Dominican convent at Cologne, in order to enjoy the instructions of the famous Albertus Magnus (q.v.). According to another account, he owed his release from confinement to the interference of the emperor and the pope. At Cologne he pursued his studies in such silence, that his companions gave him the name of the 'Dumb Ox.' But Albert, his master, is reported to have predicted, 'that this ox would one day fill the world with his bellowing.' Thoroughly imbued with the scholastic, dialectic, and Aristotelian philosophy, he came forward, after a few years, as a public teacher in Paris. His masterly application of this philosophy to the systematizing of theology, soon procured him a distinguished reputation. It was not, however, till 1257, that A. obtained the degree of doctor, as the university of the Sorbonne was hostile to the mendicant monks. He vindicated his order in his work, *Contra Impugnantes Dei Cultum et Religionem*; and, in a disputation in presence of the pope, procured the condemnation of the books of his adversaries. He continued to lecture with great applause in Paris, till Urban IV., in 1261, called him to Italy to teach philosophy in Rome, Bologna, and Pisa. Finally he came to reside in the convent at Naples, where he declined the offer of the dignity of archbishop, in order to devote himself entirely to study and lecturing. Being summoned by Gregory X. to attend the General Council at Lyons, he was surprised by death on the way, 1274, at Fossanuova, in Naples. According to a report, he was poisoned at the instigation of Charles I. of Sicily, who dreaded the evidence that A. would give of him at Lyons.

Even during his life A. enjoyed the highest consideration in the church. His voice carried decisive weight with it; and his scholars called him the 'Universal,' the 'Angelic Doctor,' and the 'Second Augustine.' A general chapter of Dominicans in Paris made it obligatory on the members of the order, under pain of punishment, to defend his doctrines. It was chiefly the narratives of miracles said to have been wrought by A. that induced John XXII., in 1323; to give him a place among the saints. His remains were deposited in the convent of his order at Toulouse. Like most of the other scholastic theologians, he had no knowledge of Greek or Hebrew, and was almost equally ignorant of history; but his writings display a great expenditure of diligence and dialectic art, set off with the irresistible eloquence of zeal. His chief works are—a *Commentary on the Four*

## AQUITANIA—ARAB.

*Books of Sentences of Peter Lombard*, the *Summa Theologiæ*, *Quæstiones Disputatæ et Quodlibetales*, and *Opuscula Theologica*. He gave a new and scientific foundation to the doctrine of the church's treasury of works of supererogation, to that of withholding the cup from the laity in the communion, and to transubstantiation. He also treated Christian morals according to an arrangement of his own, and with a comprehensiveness that procured him the title of the 'Father of Moral Philosophy.' The definiteness, clearness, and completeness of his method of handling the theology of the church gave his works a superiority over the text-books of the earlier writers on systematic theology. His *Summa Theologiæ* is the first attempt at a complete theological system. Accordingly, Pius V., to whom is due the publication of the completest collection of A.'s works (18 vols., Rome, 1570; a newer but less trustworthy ed., 23 vols., Paris 1636-41), ranks him with the greatest teachers of the church. In his philosophical writings, the ablest of which is his *Summa Fidei Catholicæ contra Gentiles*, he throws new light over the most abstract truths. The circumstance of A. being a Dominican, and boasted of by his order as their great ornament, excited the jealousy of the Franciscans against him. In the beginning of the 14th c., Duns Scotus (q.v.), a Franciscan, came forward as the declared opponent of the doctrines of A., and founded the philosophico-theological school of the Scotists, to whom the *Thomists*, mostly Dominicans, stood opposed. The Thomists leaned in philosophy to Nominalism (q.v.), although they held the abstract form to be the essence of things; they followed the doctrines of Augustine as to grace, and disputed the immaculate conception of the Virgin. The Scotists inclined to Realism (q.v.), and to the views of the Semipelagians, and upheld the immaculate conception.

**AQUITANIA**, *ăk-wē-tā'nī-a*: Latin name of a part of Gaul, originally including the country between the Pyrenees and the Garonne, peopled by Iberian tribes. Augustus, when he divided Gaul into four provinces, added to A. the country lying between the rivers Garonne and Loire. Afterwards A. passed into the hands, first, of the West Goths, and then of the Franks; and during the Merovingian dynasty, became an independent duchy. Though subjugated by Charlemagne, the duchy again claimed independence under the weak monarchs of the Carlovingian dynasty. In 1137, it was united to the crown of France by the marriage of Louis VII. with Eleanor, heiress of A. In 1152, A. became an English possession through the marriage of Henry II. with Eleanor, whom Louis had divorced, and a long series of disputes took place between England and France respecting A., which was at length ultimately united to the crown of France by Charles VII., 1451.

**ARAB**, n. *ăr'ăb*, or **ARABIAN**, n. *ă-rā'bī-ăn*, a native of Arabia. **ARABIC**, a. *ăr'ă-bīk*, or **ARABIAN**, a. *ă-rā'bī-ăn*, pertaining to Arabia or to the language of its people. **AR'ABIC**, n. the language. **ARABIST**, n. *ăr'ă-bīst*, one versed in Arabic. **ARABESQUE**, a. *ăr'ă-bēs-k* [F.]: in the



## ARABESQUE.

manner of the Arabian architecture: *N.* an ornament in *arch.*, consisting of imaginary foliage, stalks, plants, etc.; the Arabic language. *AR'ABISM*, *n.* *-bīzm*, an Arabic idiom. *ARABY*, *n.* *ār'ā-bī*, *poetic* for Arabia. *ARABS*, *n. plu.*, the wandering tribes of Arabia and Northern Africa; now applied to the destitute children wandering in the streets of towns. *ARABIC NUMERALS*, the ordinary figures used in arithmetic, introduced into Europe by the Arabians.

*ARABA*, *n.* *ār'ā-bā* [*Hindustani*, etc.]: a wheeled carriage; a gun-carriage; a kind of cart used in Eastern journeys or campaigns. Those of the higher classes are usually ornamented by carvings on the sides, rich fringes depending from the covering, etc.

*ARABATA*, *n.* *ār-a-bā'ta* [*Native name*]: an American monkey (*Myetes stramineus*).

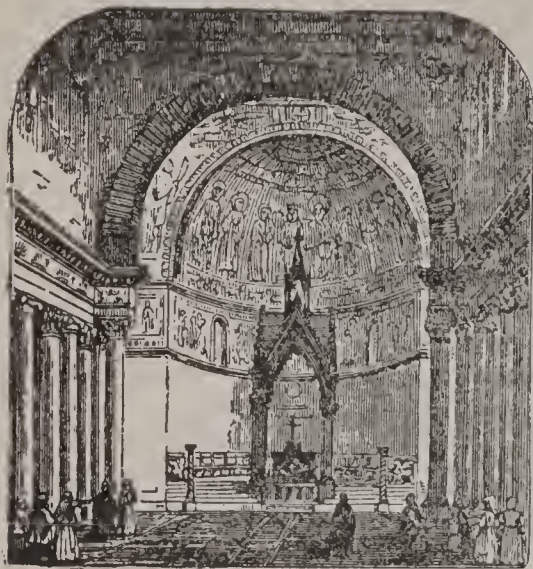
*ARABESQUE*, *ār'ā-běsk*: meaning merely *after the Arabian manner*, so far as its etymology is concerned, might be general in its application. It is, however, used especially to characterize a peculiar kind of fantastic decoration commonly employed in conjunction with architecture, and



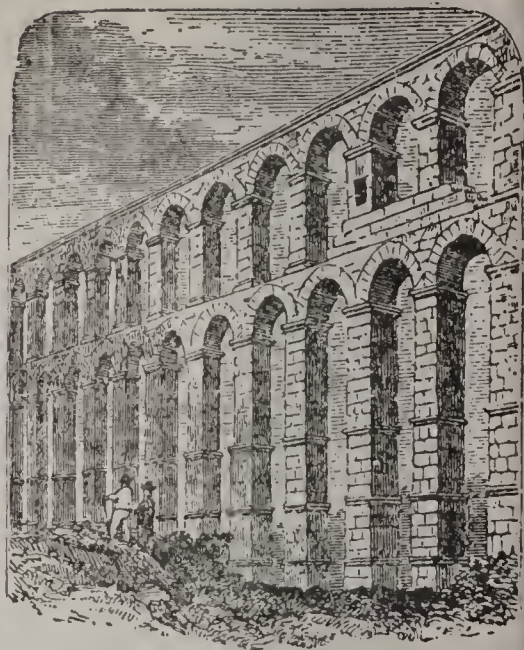
which the Spanish Moors are supposed to have introduced into modern Europe. But the species of enrichment to which this term is now applied was extensively employed both by the Greeks and Romans, the latter in particular being masters of the style. The Egyptians, from whom the Moors probably derived their original notions of this and other forms of art, also employed it in enriching their monumental decorations. But the *A.* of the Moors differed from that of the Egyptians in entirely excluding the figures of animals, the representation of which was forbidden by the Mohammedan religion, and confining itself entirely to the foliage, flowers, fruit, and tendrils of plants and trees, curiously and elaborately intertwined. This limitation of the field of *A.* was again departed from when the decorations were discovered on the walls of the baths of Titus, in the time of Leo X.; and more recently those in the houses at Herculaneum and Pompeii came to form the models of imitation, and the modern *A.* consists

Arabesque Panel.  
From the Mosque at  
Cordova.

usually of combinations of plants, birds, and animals of all kinds, including the human figure, and embracing not only every natural variety, but stepping without hesitation beyond the bounds of nature. The freedom with which it admits the fantastic is, indeed, the leading peculiarity of *A.*, which F. Schlegel termed 'the oldest and original form of fancy.' The arabesques with which Raphael adorned the



**Apse.**—Church of Sta Maria-in-Trastevere, Rome.



**Aqueduct of Segovia, Spain.**



**Aqueduct.**—Pont du Gard, Nîmes.



**Araba.** (From Lewis's *Constantinople*.)



**Cinque-cento Arabesque,** from tomb in Church of S. Pietro-in-Vinculo, Rome.



## ARABGIR.

galleries of the Vatican, and which he is said to have imitated from those which he had been instrumental in discovering in the baths of Titus, are at once the most famous and the most beautiful which the modern world has produced. Arabesques are usually painted, though the term is also applied to sculptural representations of similar subjects in low relief, and to carved or molded metal work. See GROTESQUE: ORNAMENTATION.

ARABGIR, *â-râb-ghêr'*, or ARABKIR, *-kêr'* (anc. *Anabrake*): town of Asiatic Turkey, in the vilayet of Sivas; in a mountainous and rocky district, not far from the Euphrates; 150 m. s.s.w. from Trebizond. It is to the enterprise and industry of the Armenians that the town owes its prosperity. It is noted for the manufacture of goods from English cotton yarn. The neighboring country is inhabited by Turcomans. Pop. abt. 30,000; of which nearly one-fourth Armenians, and three-fourths Turks.

## ARABIA.

ARABIA, *ă-rā'bī-a*—called by the inhabitants, Jezirat-al-Arab (the peninsula of A.); by the Turks and Persians, Arabistân: the great s.w. peninsula of Asia;  $12^{\circ} 40'$ — $34^{\circ}$  n. lat., and  $32^{\circ} 30'$ — $60^{\circ}$  e. long. Its greatest length from n.w. to s.e. is about 1,800 m.; its mean breadth, about 600; 1,230,000 sq. m. It is bounded on the n. by the highlands of Syria, and the plains of Mesopotamia (or by a line from El Arish on the Mediterranean to the Euphrates delta); on the e., by the Persian Gulf and the Gulf of Oman; on the s., by the Arabian Sea; and on the w., by the Red Sea and the Suez canal. Midway between Mecca and Medina runs the tropic of Cancer. Ptolemy is supposed to be the author of the famous threefold division into *Arabia Petræa*, i.e., the Arabia of the city of Petra, in the n.w.; *Arabia Felix* (an incorrect translation of *Yemen*, which does not signify 'happy,' but the land lying to the *right* of Mecca), along the w. and s.w. coasts; and *Arabia Deserta*, in the interior. The more precise divisions are; the *Sinaitic Peninsula* (see SINAI), between the Gulfs of Suez and Akaba; the *Hedjaz* (Land of Pilgrimage), the larger and northern strip to the e. of the Red Sea; *Yemen*, the s. and smaller strip to the e. of the Red Sea; *Hadramaut*, the region along the southern coast; *Oman*, the extreme s.e. end of the peninsula, as large as England and Wales; *El-Hasa*, along the Persian Gulf; *Nejd*, the Central Highlands of Arabia.

In shape, A. is an irregular parallelogram, broadest at the s. end; in character, it is mainly African. The vast central plateau rises from a height of 2,500 ft. in the n. to 7,000 ft. in the s.w., and is bounded by w. and s. mountain chains, the former attaining, s. of Mecca, a height of 8,500 ft. Between the mountains and the sea is a low hot strip of land, partially fertile, of varying width. There is a desert in the n. of the interior, the mountainous country of Nejd near the very centre, and to the s. of Nejd another very sterile sandy desert. Hedjaz and Yemen extend from the Red Sea indefinitely towards the interior, and consist partly of the *Tehama*, or low country, along the sea, and partly of the mountain district beyond. Mecca and Medina are in Hedjaz. Yemen is on the whole well watered, has rich and fertile valleys, and contains one-fifth of the whole population of Arabia. Yemen has two very important commercial towns, Mocha and Loheia, on the coast of the Red Sea. Hadramaut is little known, but resembles the Hedjaz in character. Oman is mainly mountainous, is partly very fertile, and possesses the good harbor of Muscat. It has some manufactures of cotton, silk, and arms. Large portions of A. are perfectly arid, but the more fertile portions are so extensive as to constitute two-thirds of the total area: one-third of the whole may be accounted desert and uninhabitable.

Our knowledge of the interior of A. is still very imperfect in detail. The largest portion of it lies in that great desert zone which stretches from the shores of the Atlantic to those of the Northern Pacific. Nejd, the l. highland or central plateau of A., is a compact settled district, culminating in the crescent-shaped Jebel Toweik, intersected by numerous



## ARABIA.

valleys, roaring torrents during the rains, but dry depressions at other times. North of Nejd, and separated from it by a narrow arm of Nefud, or the n. desert of A., is the smaller plateau of Jebel Shomer, crossed by the ranges of Jebel Aja and Jebel Selma. The n. desert, partly stony, and partly a burning expanse of red sand, is thinly sprinkled over with oases of wells and grass, serving as halting-places for the caravans of merchants or pilgrims. The oasis of *Jauf*, 60 m. long by 10 m. broad, contains three flourishing villages. *Dahna*, the s. and main desert of A., extends from Nejd and the Hadramaut coast range, and has never been explored by any European. It is, however, an almost absolutely sterile sand-waste. See MUSCAT: ZANZIBAR.

Politically, Hedjaz, Yemen, and El Hasa are really three Turkish provinces; the Sinaitic Peninsula is in Egyptian hands; England exercises much influence in Hadramaut through her possession of Aden; the sultan of Oman is practically independent, and in alliance with England; Nejd, the seat of the once powerful Wahabi State (see WAHABIS), may be said to be independent, though the emir of Shomer or Shammar, its most powerful potentate, pays a small annual tribute to the sherif of Mecca, in recognition of Turkish supremacy.

A. has, on the whole, an African climate. Though surrounded on three sides by the sea, its chains of hills exclude in a great measure the modifying influence of currents of air from the ocean. In several parts of A. hardly a refreshing shower falls in the course of the year, and vegetation is almost unknown: in other sultry districts, the date-palm is almost the only proof of vegetable life. Over large sterile tracts hangs a sky of almost unbroken serenity. The short rainy season which occurs on the w. coast, during the summer months in England and the United States, fills periodically the *wadis* (hollow places) with water, while slight frosts mark the winters in the centre and n.e. During the hot season, the Simoom (q.v.) blows, but only in the n. part of the land. The terraced districts are more favorable to culture, and produce wheat, barley, millet, palms, tobacco, indigo, cotton, sugar, tamarinds, excellent coffee, senna, and many aromatic and spice plants, as balsam, aloe, myrrh, frankincense, etc. A. is destitute of forests, but has vast stretches of desert grass fragrant with aromatic herbs, and furnishing admirable pasturage for the splendid breed of horses. Coffee, one of the most important exports, is an indigenous product both of A. and Africa.

In the animal kingdom, an African character prevails generally. Sheep, goats, and oxen satisfy the immediate domestic and personal necessities of the inhabitants, to whom the camel and horse are trusty companions in their far wanderings. Gazelles and ostriches frequent the oases of the deserts, where the lion, panther, hyena, and jackal hunt their prey. Monkeys, pheasants, and doves are found in the fertile districts, where flights of locusts often make sad devastation. Fish and turtle abound on the coast. The noble breed of Arabian horses has been cultivated for several thousand years; but the most characteristic of all animals in

## ARABIA.

the peninsula is the camel, which has been both poetically and justly styled 'the ship of the desert.' It may be regarded as an Arabian animal, for it seems to be proved that it is not a native of Africa, but has migrated from the peninsula with its master. The camel is not found among the figures of animals in the ancient Egyptian paintings on walls, nor does it appear to have been known to the Carthaginians. The breed of Oman is celebrated for its beauty and swiftness. Among the minerals of A. are iron, copper, lead, coal, basalt, and asphaltum, and the precious stones, emerald, carnelian, agate, and onyx. Pearls are found in the Persian Gulf.

But the most interesting feature of the peninsula is its ancient and peculiar population. The Arab is of medium stature, muscular make, and brown complexion. Earnestness and lofty pride look out of his glowing eyes; by nature he is quick, sharp-witted, imaginative, and passionately fond of poetry. Courage, temperance, hospitality, and good faith are his leading virtues; but these are often marred by a spirit of sanguinary revenge and rapacity. His wife keeps the house and educates the children.

Arabian life is either *nomadic* or *settled*. The wandering tribes, or Bedouins, who have, however, their allotted winter and summer camping grounds, and a strong home-feeling, entertain notions of the rights of property differing seriously from those regulating the West, yet even their most marauding tribes are not without a traditional code of law and honor. The settled tribes, styled Hadesi and Fellahs, are despised by the Bedouins, who, breathing a pure air, and living on a simple diet, are physically and morally their superiors. Arabia 'is the anti-industrial central point in the world;' for here centuries pass away without any improvement save what has been introduced, almost compulsorily, by foreigners. The export of coffee, dates, figs, spices, and drugs, though still considerable, is said to be only a shadow of the old commerce which existed before the circumnavigation of Africa, or when Aden was in its prime, and the Red Sea was the great commercial route. A. has few manufactures, but carries on a transit-trade in foreign fabrics, besides importing these to some extent for its own necessities. Education is mostly confined to that within the household, where, however, a boy is instructed in reading and writing, in grammar, history, and poetry, and where he is trained to habits of politeness and self-restraint. In the few higher public schools, writing, grammar, and rhetoric compose the whole curriculum. The government is patriarchal, and the chief men of the various tribes have the title of Emir, Sheik, or Imaum. Their function appears limited to leading the troops in the time of war, to levying tribute, and to the administration of justice. A spirit of liberty in the people moderates the authority of their chieftains; but instances of extreme despotism have not been unfrequent both in early and modern times.

*History.*—The history of A. before the time of Mohammed is involved in mystery, and has little interest, on account of its want of connection with the world's general



progress. As indicative of the African origin of the Arabs, the following particulars have been specified: the writings *Hamasa* and *Kitab-el aghanee*, which represent the 'pure' Arabs as having first settled on the extreme s.w. of the peninsula, thence spreading n. and e.; the name Himyar (dusky) which is applied to the ruling class, sometimes to the entire nation; the Himyaric tongue, which, as preserved in some proper names, etc., shows decided African affinities; the kinship between the pre-Islamitic institutions of Yemen and those of the historic Egyptians, and even of the modern Abyssinians; the African bearing of the physique and manners of the pure-blooded Arabs; the facility of marriage between the s. Arabs and the Africans, and the fecundity of such unions. The earliest trustworthy records present to us an Arabia of different kingdoms and federal governments, clustered round the desert interior, and all more or less under the rule of a race of southern origin. Yemen, (q.v.) most prosperous of these, must, as the fragmentary native records which have come down to our time attest, have enjoyed a considerable degree of civilization, with an extensive commerce, a poetic literature, and practical arts; its institutions showing some affinity to those of the Nile Valley, on the other side of the Red Sea. The Himyaritic dynasty long ruled in Yemen; and *Himyaritic* is still used of the relics of the oldest s. Arabian tongue. Hira, in the n.e. prov. of Arabian Irak, on the other hand, assimilated somewhat to the neighboring Persia; Ghassan, in the n.w., approaching more to a Byzantine complexion. In the 5th c. we find the Koreyah clan, from which Mohammed (q.v.) sprung, predominating in A., and masters of the sacred shrine of Káabeh within the precincts of Mecca, a possession giving them not only a religious pre-eminence in the peninsula, but the disposal of the accumulated offerings of gold, silver, jewels, etc., in the temple, a fund of wealth which they increased by commerce on the Red Sea coast. In the pre-Islamite times, too, was held the great annual fair of Okad, in a plain of the same name, and at a day's journey from Mecca; a fair at which horse races, gymnastic sports, poetic contests, and other amusements enlivened the seriousness of trade transactions. In the reign of Augustus, Ælius Gallus, the Roman prefect of Egypt, at the head of a large army, unsuccessfully attempted the reduction of Yemen to the Roman empire. In 529, however, Yemen was conquered by a large Abyssinian army, and was kept in subjection to the Ethiopians for 76 years. Christianity found an early entrance into Arabia. The Jews, in considerable numbers, migrated into A. after the destruction of Jerusalem, and made many proselytes, especially in Yemen. This diversity of creeds in the peninsula was favorable to the introduction of the doctrine of Mohammed, which forms the grand epoch in Arabian history, and brings it into close connection with the general history of civilization. Now, for the first time, the people of A. became united under one sceptre and one creed, and powerful enough to erect new empires in three quarters of the world; in Palestine, Mesopotamia, and Persia; in Egypt and the n. of Africa; in Spain. The dominion

## ARABIAN ARCHITECTURE.

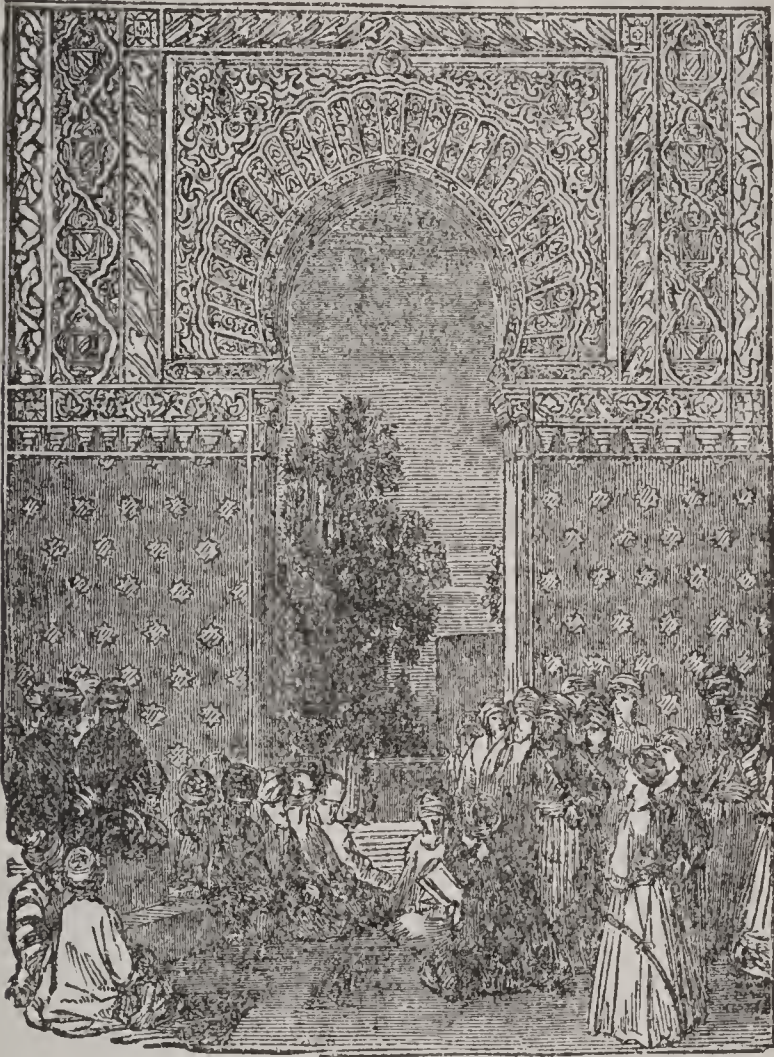
of the Arabs, from the time of Mohammed to the fall of the Caliphate of Bagdad, 1258, or even to the expulsion of the Moors from Spain, 1492, is an important period in the history of civilization. See MOORS: CALIPH. But the movements which had such great effects on the destinies of other nations left the peninsula itself in an exhausted condition. Then followed the subjugation of Yemen by the Turks in the 16th c.; their expulsion in the 17th c.; the dominion of the Portuguese over Muscat, 1508-1659; the conquests of Oman, and the temporary victories gained by the Persians at the close of the 16th c.; and, lastly, the appearance of the Wahabis (q.v.), 1770. The progress of the latter was interrupted by Mehemet Ali (q.v.), the pasha of Egypt, who subjugated the coast-country of Hedjaz, with some parts of the coast of Yemen. The events of the year 1840, in Syria, compelled Mehemet, however, to resign all claims upon the territories lying beyond the Red Sea. Since then, the political conditions have come to be as described above: see also WAHABIS. Arab influences are, of course, still powerful beyond the limits of the peninsula, in many parts of Africa, and especially in n. Africa and Egypt. Pop. of A. conjectured not much above 5,000,000.

**ARA'BIAN ARCHITECTURE:** usual term for Moorish or Mohammedan architecture. So inseparable is the connection between architecture and religion that it may be stated as a general rule that no sooner is a new religion engendered than it finds expression in new architectural forms. Of this, an interesting instance is in the simultaneous rise of Mohammedanism, and of the style of architecture commonly called Arabian or Moorish, but to which the name of Mohammedan might far more appropriately be given, seeing that it has everywhere followed the religion of the Crescent, and that the Arabians previously had no architecture peculiar to themselves. It is further remarkable that this style seems to have arisen undesignedly, or without conscious effort on the part of the people among whom it first appeared. The followers of the Prophet contemplated nothing peculiar in their ecclesiastical structures; and at first their mosques were built by Christian architects from Constantinople. As a natural consequence, they resembled Byzantine churches modified, in the countries of which the Moors successively possessed themselves, by the features of the existing churches. Gradually the new and fanciful ornamentation known as Arabesque (q.v.) was added to the recognized features of Greek and Roman edifices. The exclusion of animal figures, which their abhorrence of the very appearance of idolatry necessitated, confined the Mohammedan artists to the imitation of vegetable productions, varied by geometrical patterns and inscriptions, of which the letters were woven into forms suited for architectural uses. But the most original feature in their edifices, and that by which they have continued to be marked from all others, is the horse-shoe arch. The example in the illustration presents a form which, notwithstanding its extreme beauty, has, strange to say, scarcely ever been imitated in the Christian church. The pointed arch, on the other hand,



## ARABIAN GULF.

and the various forms of the trefoil and quatrefoil arches, though there can be little doubt that we are indebted for them to the rich invention of the Moorish architects, have become so entirely Christian as to be no longer associated in our minds with the religion of the Prophet. It is said that



Moorish Gateway.

the pointed arch is to be found in Mohammedan buildings as early as 780 (Parker's *Glossary of Architecture*), whereas the earliest examples of its use in Christian architecture belong to the 12th c. Moorish architecture probably reached its highest point of development in the Alhambra.

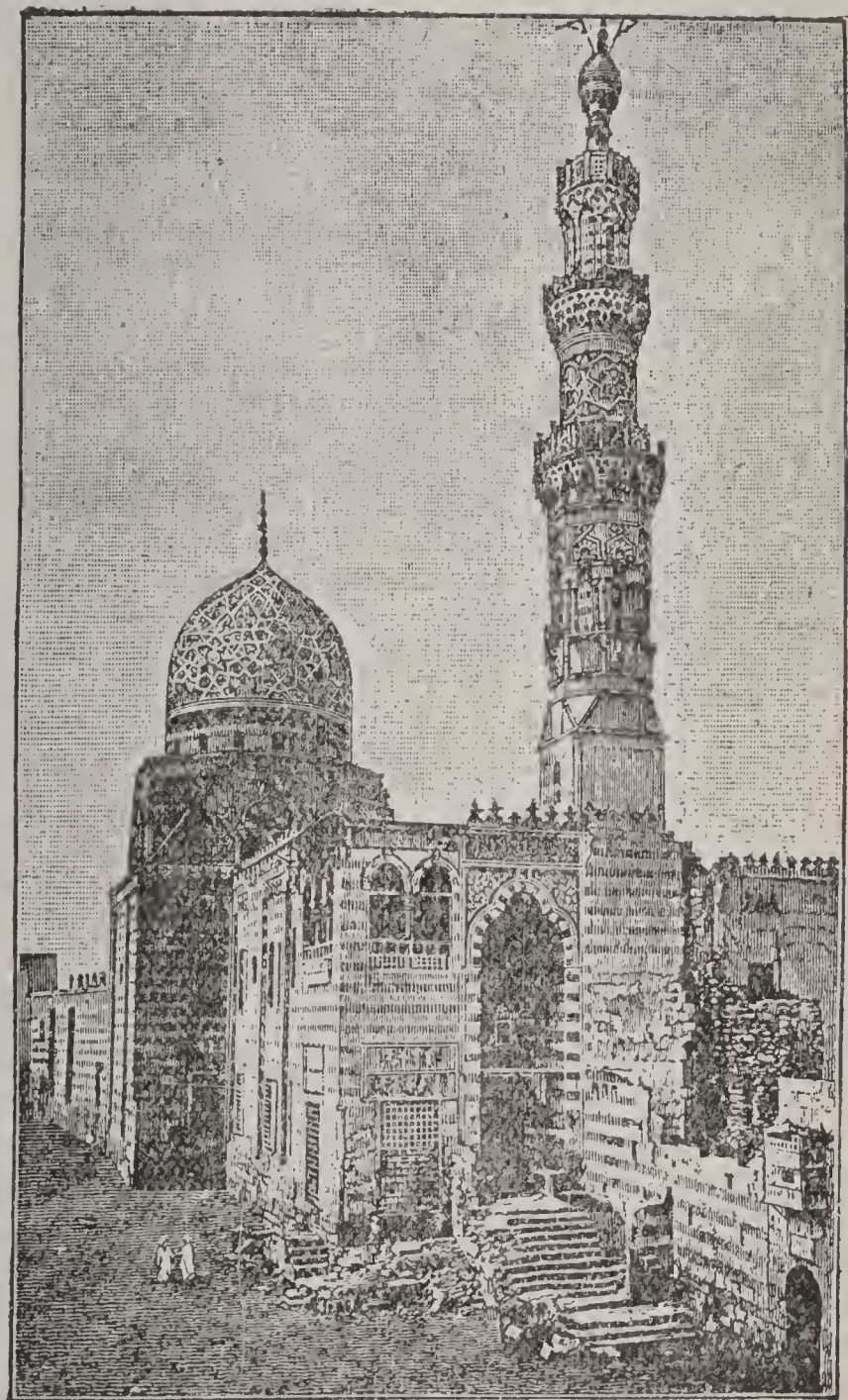
ARABIAN GULF: see RED SEA.

## ARABIAN LANGUAGE AND LITERATURE.

ARABIAN LANGUAGE AND LITERATURE: included in the Semitic family. Regarding the oldest literary culture of the Arabians, we have but slight information. That their poetry at least must have had a very early development, may be inferred from the natural disposition of the inhabitants, characterized for their high spirit, courage, love of adventure, and delight in the glory of war. As far back as Solomon's time, the queen of Sheba (probably *Arabia Felix*) was noted for her sententious sayings. The nomadic tribes, living under the patriarchal rule of their sheiks, possessed everything that was favorable to the growth of a simple and natural poetry. They had quick and vivid feelings, and a rich, glowing fancy, which, operating upon the perils, the hardships, and strange confederate life they led in those barren sand-deserts, and among naked rocks, could hardly fail to call forth a wild and vigorous minstrelsy. Before the time of Mohammed, the Arabians had celebrated poets who sang the feuds of tribes, and the praises of heroes and fair women. During the great fairs at Mecca and Okadh, poetic contests were held before the people as at the Grecian games; and the poems to which the prize was awarded, were re-written in golden characters, and suspended in the Kaaba at Mecca, the venerable national temple which the Mohammedans affirm to have been built by Abraham, or Ishmael. They are termed the *Moallakât*—i. e., 'the Suspended'—from the honor conferred on them, and are remarkable for their pathos, soaring conceptions, richness of imagery and phraseology, free and unconstrained spirit, and the glow of their love and hate. Among the famous poets of this early period are Nabegha, Asha, Shanfara—whose works were translated and published by De Sacy in his *Chrestomathie Arabe*—and, lastly, Kaab-ben-Zohair, who lived to celebrate the praises of the prophet Mohammed.

But the most brilliant period of Arabic culture is that which Mohammed himself inaugurated in the Koran. His new doctrines of faith and life, collected under this title by the first caliph, Abubekr, were revised and published by Othman, third caliph. The naturally adventurous spirit of the Arabs found a suitable excitement in the half-religious, half-military system of Mohammed; and, after his death, their fanaticism prepared them for their subsequent career. Like an overwhelming torrent, they passed over the neighboring states, and in the short space of eighty years from the death of their prophet, had extended their dominion from Egypt to India, and from Lisbon to Samarcand. During this time nothing can be said of their culture and refinement. A fanatical desire of conquest prevailed. Gradually, however, by their intercourse with civilized nations, the Arabian conquerors were themselves subjected to the humanizing influence of letters, and, after 749, or during the reign of the Abassides, literature, arts, and sciences appeared, and were generously fostered under the splendid sway, first of Almanzor (754–775), and afterwards of the celebrated Harun-al-Raschid (786–808). Learned men were now invited from many countries, and remunerated for their labors with





**Arabian Architecture.**—The Mosque of Kait Bey, Cairo. (From a Photograph by Frith.)

## ARABIAN LANGUAGE AND LITERATURE.

princely munificence; the works of the best Greek, Syriac, and old Persian writers were translated into Arabic, and spread abroad in numerous copies. The Caliph Al Mamun, who reigned 813 to 833, offered to the Greek emperor five tons of gold and a perpetual treaty of peace, on condition that the philosopher Leo should be allowed for a time to give instruction to the former. There are few instances of such a price offered for lessons in philosophy. Under the sway of the same Al-Mamun, excellent schools were founded in Bagdad, Basra, Bokhara, and Kufa; while large libraries were collected at Alexandria, Bagdad, and Cairo. In Spain, the high school of Cordova rivalled the literary fame of Bagdad, and, generally, in the 10th c., the Arabs appeared everywhere as the preservers and distributors of knowledge. Pupils from France, and other European countries, then began to repair to Spain in great numbers to study mathematics and medicine under the Arabs. There were fourteen academies, with many preparatory and upper schools in Spain, and five very considerable public libraries; that of the Caliph Hakem, containing, as is said, more than 600,000 vols. This state of culture, when compared with that prevalent before Mohammed, shows a rapidity of progress in knowledge almost as remarkable as the career of Arabian conquest.

In geography, history, philosophy, medicine, physics, and mathematics, the Arabians rendered important services to science; and the Arabic words still employed in science—such as algebra, alcohol, azimuth, zenith, nadir, with many names of stars, etc.—remain as indications of their influence on the early intellectual culture of Europe. But geography owes most to them during the middle ages. In Africa and Asia, the boundaries of geographical science were extended, and the old Arab treatises on geography and works of travels in several countries by Abulfeda, Edrisi, Leo Africanus, Ibn Batuta, Ibn Foslan, Ibn Jobair, Albiruni the astronomer, and others, are still interesting and valuable.

History was also studiously cultivated. The oldest Arabic historian now known is Mohammed-al-Kelbi (d. 819). About the same period, however, flourished several other historians. After the dawn of the 10th c., history became a favorite study of the Arabs. The first who attempted a universal survey of the subject were Masudi, Tabari, Hamza of Ispahan, and Eutychius, the Christian Patriarch of Alexandria. Masudi's work is entitled *Meadows of Gold and Mines of Gems*. These were followed by Abulfaraj and George Elmakin (both Christians), Abulfeda, and others. Nuvairi wrote a *History of Sicily under the Government of the Arabs*. Various sections of Arabic histories relating to the Crusades have been translated into French. On the dominion of the Arabs in Spain, several works were written by Abul-Kasem of Cordova (d. 1139), Temini, and others. For extended notices the student of Arabic literature is referred to the translations by Quatremère and others. Von Hammer began a history, which comes down only to the 13th c. (7 vols., 1850–56). See Zenker's *Bibliotheca Orientalis*.

Arabian theology and jurisprudence are intimately con-



## ARABIAN LANGUAGE AND LITERATURE.

nected and both founded on the Koran; but are not so simple and uniform as is generally supposed. Speculation began to prevail first during the Ommaiade dynasty, and the Aristotelian philosophy to be studied by the Arabs. As a consequence, the vague statements of the Koran were soon variously interpreted, and a host of sects gradually arose. See MOHAMMEDAN SECTS. Of these only four are regarded as orthodox, leaving not less than seventy-two heretical, whose discordant tenets are stated in the work of Sharistani (edited by Cureton, London, 1842). The four orthodox sects are: the Hanefites, who do not reject tradition, but subordinate it to rationalism; the Shafites, who entirely refuse the aids of reason and philosophy in their treatment of theology; the Kambalites and the Malechites, who allow speculation on points where there is no tradition. The collection of traditions known as the *Sunna* gives an account of the sayings and doings of Mohammed, and, though pedantic in its details, is in substance more valuable than the Koran. The interpretation of the Koran constitutes the principal part of education in theological jurisprudence. The most celebrated of the commentators are Samakhshari and Baidhawi. The conquest of Algiers has rendered the study of Arabic or Mohammedan law indispensable to the French. The result is, that several most important works on that subject have appeared of late from the Paris press, such as *Précis de Jurisprudence Musulmane, selon le Rite Maléchite par Khalil-Ibn-Ishak* (translated by Perron, Paris, 1848), and *Législation Musulmane Sunnite, Rite Hanéfi* (Paris, 1848).

Arabian philosophy, which was of Grecian origin, held the same relation to the Koran as the Scholasticism of the middle ages did to the Christian Scriptures—that is, it was regarded as the servant of faith. The chief study of the Arabs was the writings of Aristotle, who became known in Spain, and subsequently in all Western Europe, through translations from Arabic into Latin; though the Arabs themselves knew the Greek philosopher only in translations made during the time of the Abassides. Especial attention was paid to logic and metaphysics. The most distinguished of their philosophical writers are: Alkendi of Basra, about the beginning of the 9th c.; Alfarabi, who wrote a work on First Principles, 954; Avicenna (d. 1036), who combined the study of logic and metaphysics with that of medicine, and made considerable progress in chemistry, nosology, and medical botany; Ibn-Yahya, who acquired high reputation as an original thinker; Alghazali (d. 1111), who wrote a book entitled *The Destruction of all Idolatrous Philosophical Systems*; Abubekr-ibn-Tofail (d. 1190), who taught in his philosophical novel *Hai-ibn-Yokdan* (edited by Pococke, Oxford, 1671) the development of men from animals; and his pupil, Averrhoes, greatly esteemed as an expositor of Aristotle. For an account of these men and their systems, see *Sur les Écoles Philosophiques chez les Arabes*, etc., by Schmölders (Paris, 1842), and Ritter's *Ueber unsere Kenntniss der Arab. Philosophie* (Gött. 1844); also Renan's *Averroès et l'Averroïsme* (1850).

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Many of these illustrious Arabian philosophers were also physicians. The great skill which the Arabs acquired in their knowledge of the uses and properties of medicinal herbs is traced by Humboldt to their geographical position. The s. part of Arabia 'is characterized by the highly developed vital force pervading vegetation, by which an abundance of aromatic and balsamic juices is yielded to man from various beneficial and deleterious substances. The attention of the people must early have been directed to the natural products of their native soil, and those brought as articles of commerce from the accessible coasts of Malabar, Ceylon, and Eastern Africa. Hence arose the wish to distinguish carefully from one another those precious articles of commerce, which were so important to medicine, manufacture, etc. . . . The science of medicine, considered as to its scientific development, is essentially a creation of the Arabs, to whom the oldest, and at the same time one of the richest, sources of knowledge—that of the Indian physicians—had been early opened. Chemical pharmacy (see *ALCHEMY*) was created by the Arabs, while to them are also due the first official prescriptions regarding the preparation and admixture of different remedial agents—the dispensing recipes of the present day. These were subsequently diffused over the s. of Europe by the School of Salerno' (Humboldt's *Cosmos*, vol. ii. p. 581, Bohn's translation). Pharmacy and *materia medica* naturally led to botany and chemistry. For three centuries—from the 8th to the 11th—a rich scientific culture prevailed. Schools of philosophy and medicine sprang up at Jondisapur, Bagdad, Ispahan, Firuzabad, Bokhara, Kufa, Basra, Alexandria, Cordova, etc. In all departments of medical science a great advance was made, except in anatomy. The reason of this exception lies in the fact that the Koran forbids the dissection of bodies. The most famous writers on medicine are Aharun, Alkendi, Avicenna (q. v.), who wrote the *Canon of Medicine*, for a long time the only handbook on the subject; Ali-ben-Abbas, Ishak-ben-Soleiman, Abulkasem, Averrhoes (q. v.), who wrote a complete system of medicine; Ali-ben-Isa, etc.

In mathematics, the Arabs made great advances by the introduction of the numerals and mode of notation now in use, of the sine instead of the chord (in trigonometry), and of a more extended application of algebra. Astronomy was zealously studied in the famous schools and observatories of Bagdad and Cordova. Alzahan wrote upon optics; Nassiraddin translated the *Elements* of Euclid; Jeber-ben-Afla furnished a commentary on the trigonometry of Ptolemy, etc. The *Almagest* or System of Astronomy by Ptolemy, was translated into Arabic by Alhazi and Sergius as early as 812. In the 10th c., Albaten observed the advance of the line of the apsides in the earth's orbit; Mohammed-ben-Jeber-al-Batani, the obliquity of the ecliptic; Alpetragius wrote a theory of the planets; and Abul-Hassan-Ali, on astronomical instruments.

Beside these advances in the solid branches of knowledge, the genius of the Arabs continually flowered into



poetry. Numerous poets sprang up in all lands where the children of the desert had carried their irresistible faith. Their verse, however, was not the rude, simple minstrelsy of a purely patriarchal people; it gradually allied itself to the prevailing culture, and took, especially in the golden epoch of Arabian civilization, a highly artistic form. Motenebbi, Abul-Ala, and others acquired great reputation for their delicate Idyls; Busiri, for his eulogy of Mohammed; Hamadâni, as the first to introduce novels in verse (of which he wrote 400 under the title of *Makâmâl*), a style of literature brought to perfection by Hariri; Azzeddin, for his ingenious allegorical poem, 'The Birds and the Flowers.' Besides these, a singularly wild and fantastic prose literature made its appearance, in which the craving for the wonderful and gorgeous, so characteristic of the restless, adventure-loving Arabs, was richly gratified. Romances and legendary tales abounded. The most famous of these are: *The Arabian Nights' Entertainments* (q.v.), *The Exploits of Antar*, *The Exploits of the Champions*, and *The Exploits of the Hero*. In fact, with the exception of the drama, there was no sort of poetry which the Arabs did not attempt. The effect of this universality and richness in Arabic literature was, that it exercised a powerful influence on modern European poetry. The tales of fays, charms, sorceries, and the whole gorgeous machinery of enchantment passed into the poetry of the West. During the middle ages of European history, several of the most popular and widely spread books were of Arabic origin, such as *The Seven Wise Masters* and *The Fables of Bidpai*, though the Arabians themselves borrowed largely from the Persian stories and the Greek fables.

All this culture of the early ages of Mohammedanism presents a strong contrast to the ignorance which now prevails among the Arabs. The brutal fanaticism of the Turks nipped the blooming promise of the East; sunk in stupid indolence, the peoples await in apathetic resignation their deliverance and return to higher modes of life. Literature furnishes now nothing worthy of notice. Learning spends itself principally in commentaries and scholia, in scholastic discussions on the subject-matter of dogmatics and jurisprudence, and in tedious grammatical disquisitions concerning the old Arabic speech, generally acute and subtle, but always unprofitable and unenlivening. The swift and mobile genius of the East has departed and pedantic dulness has usurped its place. There are 'Dryasdusts' even in the desert. A few modern writers have attempted, with more or less success, to imitate European forms of thought and sentiment. Of these may be mentioned Michael Sabbagh of Syria (*La Colombe Messagère*, Arabic and French, Paris, 1805); the Sheik Refaa of Cairo (*The Broken Lyre*, Paris, 1827; *Manners and Customs of the Europeans*, Cairo, 1834; *Travels in France*, Cairo, 1825); and Nasif-Effendi, of Beirut, who wrote the critical observations in De Sacy's edition of Hariri (*Epistola Critica*, Leipsic, 1848).

The Arabic also possesses a Christian and Jewish literature, which, however, is chiefly ecclesiastical. Its principal

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ornaments are Eutychius, Elmakin, and Abulfaraj. Translations of the Old Test. were made not from the Hebrew, but from the Septuagint, or from Latin versions. In the middle ages, the Spanish Jews employed Arabic for their learned compositions; and several of the most important works of Moses Maimonides, etc., were originally written in that tongue.

The Arabic *language*, it has been remarked, is at once both *rich* and *poor*. It is necessarily destitute of innumerable words, describing those ideas and objects which only civilization can develop or produce; but, on the other hand, the rich and nimble fancy of the Arabians has multiplied, to an almost incredible extent, the synonyms of their desert-tongue, so that in some cases several hundreds of expressions are found for the same thing. The Arabic is distinguished among the Semitic family of languages, for its antiquity and soft flexible grace. It is divided into two dialects—northern and southern. The former, through the instrumentality of the Koran, became the predominant language of literature and commerce throughout the whole extent of the Arabian dominions; the latter, called Himyaric (q. v.), although in all probability the source of the Ethiopic language and writing, is known as yet only by a few inscriptions, etc. The earliest Arabic grammarian is Abul-Aswad-al-Duli, who lived under the fourth caliph, Ali. The first who reduced the prosody and metre of the Arabian poets to a system was Khalil-ben-Ahmed-al-Ferahidi of Basra. Al-Jauhari, who died 1009, drew up a dictionary of the pure Arabic speech, which he entitled *Al-Sihah* ('Purity'), and which is held in high estimation to this day. Mohammed-ben-Yakub-al-Firuzabadi, who died 1414, was the author of an Arabic Thesaurus, entitled *Al-Kamus* ('The Ocean'), the best lexicon in the language, and has consequently been translated into Persian and Turkish. Jordshani has explained, in alphabetical order, the meaning of the technical terms used in Arabic art and science. His work was published by Flügel (Leipsic, 1845), under the title of *Definitiones*. Meidani made a large collection of Arabic 'saws,' apothegms, etc., pub. by Freytag, Bonn, 1838. Through the conquests of the Arabs in Sicily and Spain, their language became known in Europe; but notwithstanding the numerous traces of its influence in various European tongues, it became forgotten after the expulsion of the Moors from Spain. The first European scholars who earnestly took up the subject were the Dutch, in the 17th c.; after them the Germans, French, and English. It is now, however, beginning to be considered a necessary part of a learned theological education. The modern Arabic of the inhabitants is substantially the same as that of the Koran, but the lapse of time has gradually introduced changes in the grammatical forms of the language as in other languages. Wright's *Arabic Grammar* (new edition) is one of the best extant: Lane's *Arabic-English Lexicon* is a standard work; and Badger's *English-Arabic Lexicon* (1881) is also excellent. The grammatical and lexicographical works of Caspari, Freytag, Fleischer, De Sacy, and Boethor, are most important.



## ARABIAN NIGHTS' ENTERTAINMENTS.

*Arabic Writing.*—Like all Semitic writing, this proceeds from right to left. It is borrowed from the old Syriac, and was probably introduced into Arabia by Christian missionaries about the time of Mohammed. In its oldest form it is called Kufic, from the town of Kufa, on the Euphrates, where the transcription of the Koran was busily carried on. Its characters are rude and coarse, and it has particular symbols for only sixteen of the twenty-eight Arabic consonants. This writing, nevertheless, continued to be employed for 300 years, and for coins and inscriptions even later; but in the 10th c. it was displaced for common purposes by a current handwriting, the *Neskhi*, introduced by Ebn Mokla. This is the character still in use. In this the consonants which resemble each other are distinguished by points, and the vowels by strokes over and under the line.

ARABIAN NIGHTS' ENTERTAINMENTS: a collection of Oriental tales, first made known to Europe by Antony Galland, a French orientalist, under the title of *The Thousand and One Nights, Arabian Stories, Translated into French*; pub. Paris, 12 vols. 12mo, 1704-17, and received by many as the production of the genius of the translator himself, rather than the collection of *an unknown Arabian author*, as Galland had stated in his dedication. Oriental scholars did not hesitate at first to declare against their authenticity, and denounce them as forgeries. Having taken only an obscure place in the literature of the East, and their style unfitting them from being classed among models of eloquence or taste—having no object of a religious, moral, or philosophic kind in view, while the manners and customs delineated in them were different from all received ideas of those of the Moslem nations—their success took the critics by surprise. The work became highly esteemed by the public; it filled Europe with its fame; it had abundance of readers, and no lack of editors. Few books have been translated into so many different languages, and given delight to so large a number of readers. It may be said that, in these oriental tales, there has sprung up a new branch of literature, for their influence on the literature of the present day is easily discernible. Here are found, depicted with much simplicity and great effect, the scenes of the town-life of the Moslem. The prowess of the Arab knight, his passion for adventure, his dexterity, his love and his revenge, the craft of his wives, the hypocrisy of his priests, and the corruptibility of his judges, all are dramatically delineated—far more vividly represented, in fact, than is possible in a book of travels; while gilded palaces, charming women, lovely gardens, and exquisite repasts captivate the senses of the reader, and transport him to the land of wonder and enjoyment. Besides entertaining the mind with the kaleidoscopic wonders of a teeming and luxurious fancy, which is their most obvious merit, they present a treasure of instruction upon life in general, and oriental life in particular. And this is undeniable, notwithstanding the fact that the aspects of society they depict are far from high in the social scale, either as to civilization or morality. In them no story is to be found that will rank in morality with the story of

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Joseph and his brethren, simply because the Moslem faith will not admit of that, any more than the decline of Arab civilization at the time the tales must have been originally promulgated. Indeed, Galland, the first translator, having a conviction of a demoralizing tendency of this kind, avoided giving several objectionable parts of some of the stories. The thread of the narrative in these entertainments is generally simple and clear, often leading into the departments of fable, and occasionally into the regions of the supernatural and the domains of popular superstition. The tales, even when long, are not tiresome; for they consist of shorter stories branching off from the main one, or rather encased within it, the smaller within the larger, and perhaps a smaller within that, like the little boxes used by conjurors.

For many years all doubt as to the authenticity of *The Thousand and One Nights* has been dispelled. Several MS. copies have been found, and no less than four editions of the Arabic text have been published. A more thorough acquaintance with mediæval and modern Arab life has proved the genuineness of the stories, and the truthfulness of their general representation of the mind of the Moslem. In them there are evident signs of a declension from a refined and superior civilization; the marvellous and supernatural is predominant; despotism in all its forms is manifest; and a prevalent falsity and insincerity of character visible, not only in the narrative, but in the tone of common conversation, replete as it is with oaths and asseverations.

The origin of the work—where and by whom written—is still involved in mystery. According to some, the tales are susceptible of a threefold division. The most beautiful, and in fancy the richest, appear to have come from India, the cradle of story and fable; the tender, and often sentimental, love tales seem of Persian origin; while the masterly pictures of life, and the witty anecdotes, claim to be the product of Arabia. Throughout, however, everything is conformable to the character and customs of the town population of Arabia, and to the Mohammedan faith. The Baron de Sacy, 1829, thus stated his opinion on these points. Speaking of the work he says: 'It appears to me that it was originally written in Syria, and in the vulgar dialect; that it was never completed by its author; that, subsequently, imitators endeavored to perfect the work, either by the insertion of novels already known, but which formed no part of the original collection, or by composing some themselves, with more or less talent, whence arise the great variations observable among the different MSS. of the collection; that the inserted tales were added at different periods, and perhaps in different countries, but chiefly in Egypt; and, lastly, that the only thing which can be affirmed, with much appearance of probability, in regard to the time when the work was composed, is, that it is not very old, as its language proves, but still that, when it was brought out, the use of tobacco and coffee was unknown, since no mention of either is made in the work.'

Galland's French edition was speedily translated into all the languages of Europe; edition following edition with



## ARABIAN NUMERALS—ARABIAN SEA.

great rapidity, some of them with enlargements, and others with modifications. A new English translation from the Arabic appeared in 1839 (new issue, edited by S. Lane Poole, 1882). It was the work of E. W. Lane, a gentleman whose long residence in Egypt enabled him to acquire so thorough a knowledge of the language, manners, and customs of the Egyptian Arabs, as furnished not only a superior version, but a series of notes embodying a portraiture of Egypto-Arabian life at once faithful and vivid. A complete translation by Payne was pub. by the Villon Society (9 vols. 1882-84); and in 1885 Captain Burton began to issue his complete translation (10 vols.).

The popularity of this wonderful book has given rise to hundreds of imitations. Among the best of the French are—*Les Mille et Un Jours*, *Mille et Une Quart d'Heures*, and the *Contes d'un Endormeur*; perhaps the best of the English imitations is the *Tales of the Genii*, by Sir Charles Morell; while the best of the German appears to be one from the Perso-Arabic, the *Faraj bād el Shidda* (Joy after Sorrow), a popular work, and repeatedly published.

ARABIAN NUMERALS, or CIPHERS: the characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. Properly they should be styled Hindu or Indian Numerals, for the Arabs borrowed them, along with the decimal system of notation, from the Hindus. According to one account, Gerbert (afterwards Sylvester II.) learned the use of them from the Moors in Spain in the 10th c.; others think it more probable that Leonardo of Pisa (see ALGEBRA) first introduced them from the East into Italy abt. 1202. Yet the use of them was long in making its way, and was not general before the invention of printing. Accounts continued to be kept in Roman numerals up to the 16th c. See NUMERALS: NUMERATION.

ARABIAN SEA, anciently *Mare Erythræum*, or the *Red Sea*: bay of the Indian Ocean, between India on the e. and Arabia on the w. Its northern boundary is Beloochistan; while its natural and convenient limit on the s. is a line drawn from Cape Comorin in Hindustan to Cape Guardafui in Africa, and thence continued along the coast to the Strait of Bab-el-Mandeb. In e. long. it extends from 43° 32' at Cape Bab-el-Mandeb, to 77° 30' at Cape Comorin; and in n. lat. from 8° 5' at Cape Comorin, to abt. 26° at the s.w. point of Beloochistan. Including its two great arms, the Red Sea proper and the Persian Gulf, it stretches far both n. and w. By the former it is, since the opening of the Suez canal in 1869, connected with the Mediterranean Sea. In this last aspect the A. S. long occupied a most prominent place in the commerce of the world—a place which, after having lost it for more than 300 years through the doubling of the Cape of Good Hope in 1497, it has lately in a great measure regained, through the enterprise of English capitalists, the Egyptian government, and the perseverance of M. Lesseps.

In the history of navigation, also, the A. S. proper is specially entitled to notice. It was along its n. shores that Nearchus, admiral of Alexander of Macedon, conducted the first well-authenticated voyage, on a large scale, of explora-

## ARABIN—ARACAN.

tion and discovery; and across it the trade-winds, blowing alternately from n.e. and s.w., were wont to waft the Greeks of Egypt, without either chart or compass, about the commencement of the Christian era. See SUEZ CANAL.

ARABIN, n. *ār'ā-bīn* [formed from *Arabic*]: the soluble gummy principle of gum arabic (q.v.);  $C_{12}H_{22}O_{11}$ , isomeric with cane-sugar; obtained pure by adding alcohol to a solution of gum-arabic in water, when the A. is precipitated in white flocculi.

ARABI PASHA: see EGYPT.

ARABLE, a. *ār'ā-bl* [F. *arable*—from L. *arabilis*—from L. *aro*; Gr. *arōō'*, I plow]: land that can be plowed or cultivated.

ARACAN, or ARRACAN, *ā'rá-kān'*: most n. division of British Burmah; bounded on the n. by Chittagong, on the e. by Ava, on the s. by Pegu, on the w. by the Bay of Bengal; n. lat. from  $18^{\circ}$  to  $21^{\circ} 33'$ , e. long. from  $92^{\circ} 10'$  to  $94^{\circ} 50'$ . Its extreme length is 290 m.; and its breadth, from 90 m. at the n., gradually diminishes towards the s., so as to yield an average of little more than 45; 14,526 sq. miles. A range of mountains, nearly parallel with the line of coast, the highest point 7,000 ft. above the sea-level, separates A. from Pegu and Upper Burmah. The soil of the n. portion of A. is alluvial; but the country is hilly, difficult of access, and covered with forest. The province is divided into four districts—Akyab, Sandoway, Kyouk-Pyou, and North Aracan. The British conquest of the province has been highly beneficial in every way. Rice and salt are chief articles of exportation; the others are tobacco, sugar, wood, oil, betelnuts, buffalo hides and horns, elephants' teeth, dried fish, and edible birds' nests. The imports consist of British woollens, muslins, cutlery, and glass. Pop. (1825-6) abt. 100,000; (1831) 173,000; (1839) 248,000; (1872) 483,363; (1881) 587,518; (1894) 671,899.

There have been various indications of volcanic action in A. In the islands of Ramree and Cheduba are springs of muddy water which emit bubbles of gas. Two severe earthquakes have taken place, 1763 and 1833—the latter having thrown up, in several places, muddy water of a sulphurous smell, and also, on one particular spot, vapor and flame to the height of several hundred feet. Of the mineral resources very little is known. Iron-ore has been found, but not in such quantity and quality as to come into profitable competition with British iron. Coal exists, understood to be good; but has not been extensively worked. There are no lakes in the province, nor are there any rivers of importance, though the Aeng, which appears to be the most available among them, is said to be navigable during spring-tides 45 m. from its mouth.

ARACAN, or ARRACAN, or MRO-HOUNG [Old Town]: city of British Burmah; formerly cap. of the prov. of A.; about 50 m. from the sea; lat.  $20^{\circ} 42'$  n., long.  $93^{\circ} 24'$  e. Lying in a swampy valley which, on almost every side, is confined by hills, A. is subject to febrile disease in all its forms. Previous to the first Burmese war—the occasion which



## ARACARI—ARACHNIDA.

brought it under British dominion—it is said to have contained 18,000 houses; but in 1835, after it had ceased to be the seat of government, the population had sunk to 8,000. In 1877, the inhabitants of the town hardly exceeded 2,000. The most striking memorial of antiquity is its dilapidated fort, consisting of three concentric walls such as only a powerful state could have constructed. Beyond the limits, too, of this citadel, the town, as a whole, appears to have been surrounded by a circumvallation 9 m. in length, composed partly of steep and rugged eminences and partly of artificial works. These defenses, which are believed to be several centuries old, the British carried by assault, 1825, April 1.

**ARACARI**, *á-rá-sá'ri*, or **ARICARI** (*Pteroglossus*): genus of birds closely allied to the Toucans (see **TOUCAN**), and differing from them chiefly in the somewhat smaller bill, which is not so thick as the head. They are generally also of smaller size, and the prevailing color of their plumage is green, often varied with brilliant red and yellow. Like the Toucans, they are natives of the warm parts of S. America.

**ARA'CEÆ**: see **ARUM**.

**ARACHIS**, *ár'ă-kîs*: genus of plants of the natural order *Léguminosæ*, sub-order *Papilionaceæ*, natives of the warm parts of America, of which the principal and, until recently, the only known species was the *A. hypogæa*, sometimes called the underground kidney-bean, and more frequently the ground-nut, or peanut. It also receives the names of earth-nut and mandubi. It is an annual plant, with hairy pinnate leaves, which have four leaflets. The flowers are yellow, the standard veined with red. After flowering, the flower-stalks elongate and bend toward the earth, into which the pods penetate, ripening underground. The seeds are in some countries a principal article of food; but the importance of the plant is due chiefly to the fixed oil in the seeds, similar to olive oil or almond oil. It is cultivated in all warm regions of the world. The root is used sometimes as a substitute for licorice. See **PEANUT**.

**ARACHNIDA**, *ă-răk'nî-dă*, or **ARACHNIDES**: sub-class of *Tracheate Arthropoda* (q.v. under **ARTICULATA**), including scorpions, spiders, mites, etc., and first separated by Lamarck from the *Insecta* of Linnæus. The body is usually divided into cephalo-thorax and abdomen, the latter destitute of appendages, the former possessing six pairs, of which the posterior four pairs are walking limbs, thus furnishing a ready means of distinction from insecta, which have three pairs only. The two anterior pairs known as chelicerae and pedipalpi are of various forms, the former usually chelate or sub-chelate; the latter chelate, ambulatory, or antenniform. Respiration is effected by means of tracheal tubes, or by pouches—the so-called respiratory sacs.

Those *A.* with segmented abdomen are termed *Arthrogastra*, or *Pedipalpi*; families five of which *Scorpio*, *Thelyphonus*, *Chelifer*, *Galeodes*, and *Phalangium* are types. These show a distinct gradation to true spiders or *Araneina*, which are easily recognized by their unsegmented abdomen usually furnished with spinning-glands, opening by four to

## ARACHNOID—ARAD.

six posterior papillæ, and by their sub-chelate chelicæræ and ambulatory pedipalpi. The mites and ticks (*Acarina*) have the unsegmented abdomen, continuous with the thorax, and the chelicæræ and pedipalpi are modified into a sucking or piercing apparatus. The *Linguatulida* (*Pentastomum*), the *Tardigrada*, and the *Pycnogonida*, have usually been reckoned as highly modified A., somewhat akin to the *Acarina*; the, most recent anatomists, however, tend to remove them from the A. altogether. On the other hand, it has lately been clearly shown that the Silurian *Eurypterida*, and the ancient, but still persistent *Limulus* (see KING-CRAB), must be reckoned rather as A. than as Crustaceans, and thus the two great divisions of the Arthropoda, the Tracheata and the Branchiata, appear to have diverged in palæozoic times. See ACARUS: MITE: SCORPION: SPIDER: TICK: also Huxley's *Anat. of Invertebrated Animals* Balfour's *Comparative Embryology*, and Cambridge's memoir in *Encyc. Britannica*, 9th ed.

**ARACHNOID**, n. *ă-răk'noyd* [Gr. *arachnē*, a spider; *eidos*, form]: in *anat.*, the serous membrane covering the brain, and lying between the *pia-mater* and *dura-mater*: **ADJ.** in *bot.*, having fine hairs so entangled as to resemble a cobweb; spider-web-like. **ARACHNIDA**, n. plu. *ă-răk'nă-dă*, or **ARACH'NIDANS**, n. plu. *-năd-ănz* [see *ĪDÆ*, postfix]: a class of articulata, comprising spiders, mites, and scorpions. **ARACHNITIS**, n. *ăr'ăk-nă'tis*, inflammation of the arachnoid membrane.

**ARACHNOID MEMBRANE**, *ă-răk'noid*: one of the three coverings of the brain and spinal cord; a thin glistening, serous membrane, which by its parietal layer adheres inseparably to the dura-mater on its outer side, and more loosely to the pia-mater which is between it and the brain substance. Between the pia mater and the A. M. in some situations there are considerable intervals (sub-arachnoid spaces); they are filled with a fluid named cerebro-spinal, the presence of which is necessary to the proper action of the nervous centres. See CEREBRO-SPINAL FLUID: PIA-MATER.

**ARAD**, *ăr'ăd*: t. in the dist. of A. in Upper Hungary; on the right bank of the Marosh, an affluent of the Theiss; and is also styled Old A. to distinguish it from New A., on the opposite side of the river. A. carries on a large trade in corn, tobacco, etc., and was at one time the greatest cattle-market in Hungary, and is even yet inferior only to Pesth and Debreczin. During the 17th c., it was often captured, and at last destroyed by the Turks. Its new fortifications, erected 1763, made A. an important position in the revolutionary war of 1849, when it was occupied for a considerable time by the Austrian general Berger, who capitulated here, July, 1849. From A. Kossuth issued his proclamation, 1849, Aug. 11, in which he expressed in impassioned terms his despair of the Hungarian cause for the present. After the catastrophe of Világos, Aug. 17, A. was surrendered to the Russians through the treachery of Görgey. Pop. (1900) 56,260, including many Jews who are very wealthy.



## ARÆOMETER—ARAGO.

NEW A., a t. in the Banat of Temesvar, contains about 6,000 inhabitants, including many Germans, who are the principal persons in the place.—The dist. or prov. of A. has 1,700 sq. m. The e dist. is occupied by a branch-chain of the Carpathian Mts., which contain marble quarries, and mines of copper and iron; the w. is level, and produces wheat, maize, and several varieties of wine, as well as abundance of fruits. The inhabitants are chiefly Wallachians. Pop. of prov. (1894) 304,813.

ARÆOMETER: see AREOMETER.

ARÆOSTYLE, n. *ă-rē'ō-stīl* [L. *areostylus*: Gr. *araios*, thin, narrow, with intervals; *stulos*, a pillar]: in *arch.*, a kind of intercolumniation in which the pillars are so wide apart that the intermediate spaces are each upwards of three diameters of the column. This constitutes one of the five kinds of intercolumniation described by Vitruvius: ADJ., pertaining to.

ARÆOSYSTYLE, n. *ă'rē-o-sīs'tīl* [Gr. *araios*, thin, narrow; *sustulos*, with columns standing close]: an arrangement in which columns are coupled; for example, in the w. front of St. Paul's Cathedral, London.

ARAFAT, *ă'râ-fât'*, MOUNT, or *Jebel-er-'rahme* ['Mount-ain of Mercy']: a granite hill abt. 15 m. s.e. of Mecca; believed by the Mohammedans to be the spot where Adam, conducted by the angel Gabriel, met again his wife Eve, after a punitive separation of 200 years, on account of their disobedience in Paradise. It is not above 200 ft. high, but its circuit is a mile and a half. Its importance since the time of Mohammed arises from its being the scene of a yearly procession of the faithful who visit Mecca. Burckhardt, who witnessed the procession of 1814, states that not less than 70,000 people were present, and that at least forty different languages were spoken. The principal part of the religious ceremony of this pilgrimage is a sermon, the hearing of which entitles all to the name and privileges of a Hadji.

ARAGO, *ăr'a-go*, *ă-râ-gō'*, or *ă-râ'go*, DOMINIQUE: 1786, Feb. 26—1853, Oct. 3; b. Estagel near Perpignan, dept. of the E. Pyrenees; celebrated French astronomer and natural philosopher. At the age of 17, he entered the Polytechnic School at Paris, where the spirit, promptitude, and vivid intelligence of his answers to the questions of Legendre excited admiration. In 1804, he became sec. to the observatory at Paris. Two years afterwards, he was engaged, with Biot and others, by the French government, to carry out the measurement of an arc of the meridian, which had been commenced by Delambre and Méchain. A. and Biot had to extend it from Barcelona to the Balearic Isles. The two *savans* established themselves on the summit of Mount Galatza, one of the highest of the Catalonian branch of the E. Pyrenees. Here they lived for many months, communicating by signals with their Spanish collaborateurs, across the Mediterranean in the little isle of Iviça, though many a night the furious tempests destroyed their hut together with the labors of weeks. Visitors they had none, except two

Carthusian monks, who were wont to come up and spend a portion of the evening in converse with them. Before A. had completed his calculations, Biot had returned to France, and war had broken out between the two nations. A was now held to be a spy; his signals were interrupted; and with great difficulty he succeeded in making his escape to Majorca, where he voluntarily imprisoned himself in the citadel of Belver, near Palma. At last he obtained his liberty on condition of proceeding to Algiers, which he did; but was captured, on his return to France, by a Spanish cruiser, and sent to the hulks at Palamos. He was, however, liberated after a time, and sailed once more for France; but almost as he was entering the port of Marseilles, a tempest arose which drove the vessel across the Mediterranean all the way to Algiers. The former dey, to whose demands he had owed his liberation from the hulks, was dead; his successor, a ferocious tyrant, placed him on his list of slaves, and intended to employ him as interpreter. After some time, he was released at the request of the French consul, and, narrowly escaping another capture by an English frigate, finally found his way to Marseilles 1809, July. As a reward for his suffering in the cause of science, the Acad. of Sciences suspended its standing rules in his favor; and though only 23 years of age, he was elected member in the place of Lalande, who had just died, and was appointed Professor of Analytical Mathematics in the Polytechnic School. Afterwards, his attention was given more to astronomy, magnetism, galvanism, and the polarization of light. In 1811, he read a paper to the Academy, which may be considered the foundation of 'chromatic polarization.' In 1812, he commenced his extraordinary course of lectures on astronomy, etc., which fascinated all Paris—the savans, by their scientific rigor and solidity; the many, by their brilliancy of style. In 1816, with Gay Lussac, A. established the *Annales de Chimie et de Physique*, and confirmed the truth of the undulatory theory of light. In the same year he visited England for the first time, and made the acquaintance of various persons distinguished in science, especially Dr. Thomas Young. In 1818, appeared his *Recueil d'Observations géodésiques, astronomiques et physiques*. In 1820, he turned his facile and inventive genius into a new channel, and made several important discoveries in electro-magnetism. Oersted had shown that a magnetic needle was deflected by a voltaic current passing along a wire. A. pursued the investigation, and found that not only a magnetic needle, but even non-magnetic substances, such as rods of iron or steel, became subject to deflection also, exhibiting during the action of the voltaic current a positive magnetic power, which, however, ceased with the cessation of the current. Some time after, he demonstrated that a bar of copper, and other non-magnetic metals, when moved circularly, exert a noticeable influence on the magnetic needle. For this discovery of the development of magnetism by rotation, he obtained, in 1825, the Copley Medal of the Royal Society of London; and in 1834, when he again visited Great Britain, especial honors



## ARAGO.

were paid to him by the friends of science in Edinburgh and Glasgow. Four years previous to this second visit to Great Britain, he had received the honor he most coveted—that of being made Perpetual Sec. of the Acad. It was while holding this office that he wrote his famous *éloges* of deceased members, the beauty of which has given him so high a place among French prose-writers. As a politician, also, his career was remarkable. He was a keen republican, and was prominent in the July revolution (1830). In the following year he was elected by Perpignan as a member of the chamber of deputies, where he occupied a position on the extreme left. In the February revolution of 1848, he was chosen a member of the provisional government, and appointed minister of war and marine. In this position he resisted the proposed measures of the socialist party, and advocated the constitution of the United States as the beau-ideal of democracy. His popularity in his own province was the means of preventing the discontented population of the E. Pyrenees from proceeding to lawless and violent measures. On the question of the presidency, A. opposed Louis Napoleon, declared himself against the policy of the new ministry, and refused to take the oath of allegiance after the *coup d'état* of 1851. Napoleon, however, made a special exception in his favor, and allowed him to retain the directorship of the observatory. His works were edited by Barral (17 vols., 1854–62), and a statue of him was erected at Perpignan in 1879. See Audiganne's *A., son génie et son influence* (2d ed. 1869).

ARAGO, ÉTIENNE: archivist in the *Ecole des Beaux Arts*: 1802, Feb. 9—1892, Mar. 6: brother of Dominique. He held an appointment under the provisional government as director-general of the post-office, in which he showed great vigor, promptitude, and sagacity, and achieved several postal reforms; was elected member of the national assembly; was compromised by the insurrection in June, and sentenced to exile for life. In 1859, he returned to France; and at the time of the Franco-Prussian war was mayor of Paris, resigning, 1870, November.

ARAGO, JACQUES ÉTIENNE VICTOR: 1790–1855, Jan. 1; brother of Dominique, the great savant. In 1817, he accompanied the expedition under Freycinet in a voyage round the world. Afterwards, at Bordeaux and at Toulouse, he was engaged in several branches of light literature, industriously writing, in company with other scribes, a multitude of vaudevilles, besides publishing several poems and romances. In 1835, he undertook the management of the theatre at Rouen; but having become afflicted with blindness, he was compelled to resign this post in 1837. His early voyage round the world was the occasion of two very pleasant books of travel: *Promenade autour du Monde* (Paris, 1838); *Souvenir d'un aveugle, Voyage autour du Monde* (Paris, 1838). In 1849, though deprived of sight, he formed a company of speculators, placed himself at the head of it, and departed for California, to search for gold on a large scale. His companions mutinied, and left him, deserted

## ARAGO—ARAGON.

and disappointed, at Valparaiso. On his return, he published his painful experiences, under the title, *Voyage d'un aveugle en Californie et dans les Regions aurifères* (Paris, 1851).

ARAGO, JEAN: 1789–1836; brother of Dominique: was general of the republican army in Mexico, and wrote, in Spanish, a history of Mexico.

ARAGON, *är'a-gon*: anciently a kingdom, then a prov. in the n.e. of Spain; bet  $40^{\circ} 2'$  and  $42^{\circ} 54'$  n. lat., and long.  $2^{\circ} 10'$  w. and  $0^{\circ} 45'$  e.; greatest length from n. to s., 190 m.; breadth, 130 m.; 17,900 sq. miles. It is bounded, n. by the Pyrenees, separating it from France; w., by Navarre, and Old and New Castile; s., by Valencia, and part of New Castile; and e., by Catalonia, and part of Valencia. The river Ebro, which descends from the n. heights of Old Castile, flows through the middle of A., receiving numerous tributaries both from the lofty regions of the Pyrenees and from the Sierras in the s.; of the former, the principal are: the Noguera, which forms the boundary line between A. and Catalonia, the Essera. and the Gallega; of the latter, the principal are: the Guadalope, the San Martin, and the Salon. The prov. is naturally divided into the level country, along the Ebro, and the n. mountainous district of Upper Aragon. The central plain is sterile, poorly supplied with water, and intersected by deep ravines (*barancos*). Agriculture is here confined to the raising of maize, vines, and olives; but on the sides of the Ebro, where water abounds, rice and other grains are abundantly produced; and in the valleys of upper A., the most beautiful and fertile of all the Pyrenean valleys, we find a splendid vegetation, and a soil that enables the inhabitants, in spite of the wretchedness of their agriculture, to grow considerable wheat, rye, maize, barley, etc. The climate of the prov. is various; comparatively cool in the mountain-districts, but often very sultry on the plains. Spurs of the Pyrenees strike down far into the prov., and between these ridges the rich valleys lie, some of them upwards of 20 m. long. The slopes of the hills are clothed with forests of oak, beech, and pine, and the felled timber is floated down the rivers into the Ebro, and thence down to Tortosa at its mouth. The minerals of the prov. are copper, lead, iron, salt, alum, saltpetre, coal, and amber. The manufactures are inconsiderable.

A., peopled by a brave, active, enduring, but obstinate, race, has frequently been the arena of sanguinary warfare. It early became a Roman prov.; and, on the fall of the empire, passed into the hands of the West-Goths, but was conquered by the Moors in the beginning of the 8th c. The rulers of A., after it had been recovered from the Moors, and united with Catalonia (1137), became powerful; obtained possession of the Balearic Isles in 1213; of Sicily in 1282, of Sardinia in 1326, and of Naples in 1440. By the marriage of Ferdinand with Isabella, heiress of Castile, in 1469, the two states of A. and Castile were united, and formed the foundation of the great Spanish monarchy. After Ferdinand's death in 1516, the union of the states was



## ARAGONA—ARAL.

made permanent. In the war with the French, 1808-9, Saragossa, the cap. of A., was remarkable for its heroic defense under Palafox; and in recent Spanish wars, the people of A. have displayed the same courage which marked their conduct on that memorable occasion. Upper A. was on the side of the queen; but Lower A. generally adhered to the party of Don Carlos. The prov. is now divided into three depts.—Saragossa, Teruel, and Huesca. The chief towns are Saragossa, Calatayud, Huesca, and Teruel. See SARA-GOSSA, etc. Pop. of A. (1900) 912,711.

ARAGONA, *â-râ-gō'nâ*: t. of Sicily, 8 m. n.n.e. from Girgenti. It is a poor town, and stands in the midst of bare green downs; but the hills above it are clothed with pines, cypresses, olives, almonds, and carobs. The only object of interest is the old castle of the princes of Aragona, a huge building, in the Renaissance style, which has fallen much into decay. Pop. 10,000.

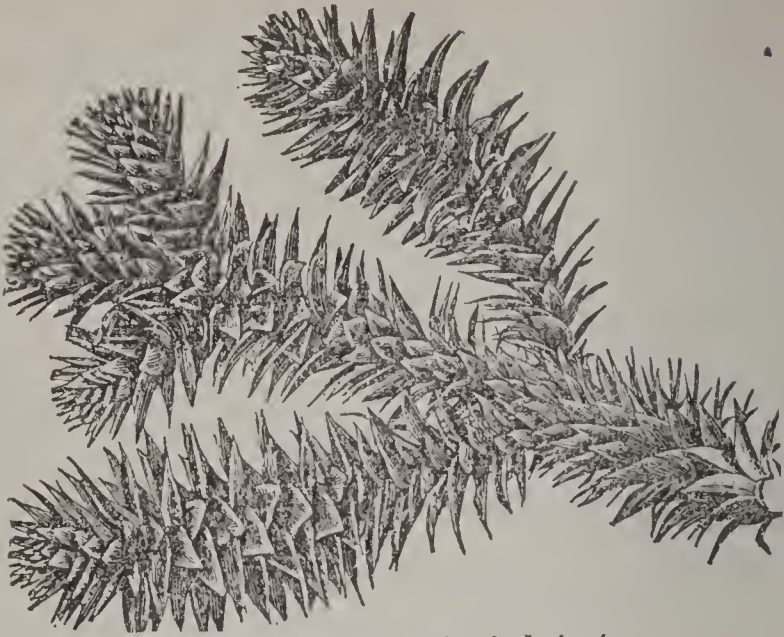
ARAGONITE: see ARRAGONITE.

ARAGUATO, *âr â-gicâ'tō* (*Mycetes ursinus*): the largest known species of new world monkeys. Its discordant yells may be heard at a mile's distance.

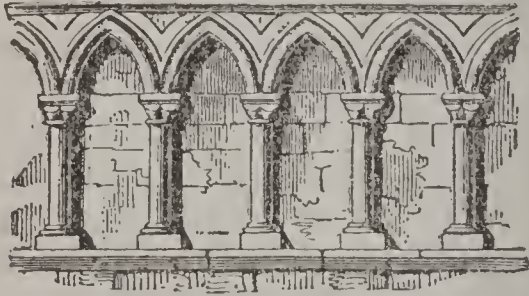
ARAGUAY, *â-râ-gwî'*: large river of Brazil, rising in s. lat. 18° 10' and w. long. 51° 30'. Like most of the considerable rivers of the country, it flows towards the n. After a course of about 1,000 m. to San Joao, it there joins the Tocantins, which, after a n. course of 300 m. more, mingles its estuary with that of the Amazon round the Isle of Marajo. Like most of the rivers in this part of Brazil, the A. is of difficult navigation, frequently interrupted by rapids.

ARAISE, v. *â-râz'* [AS. *a*, and *raise*]: in *OE.*, to raise.

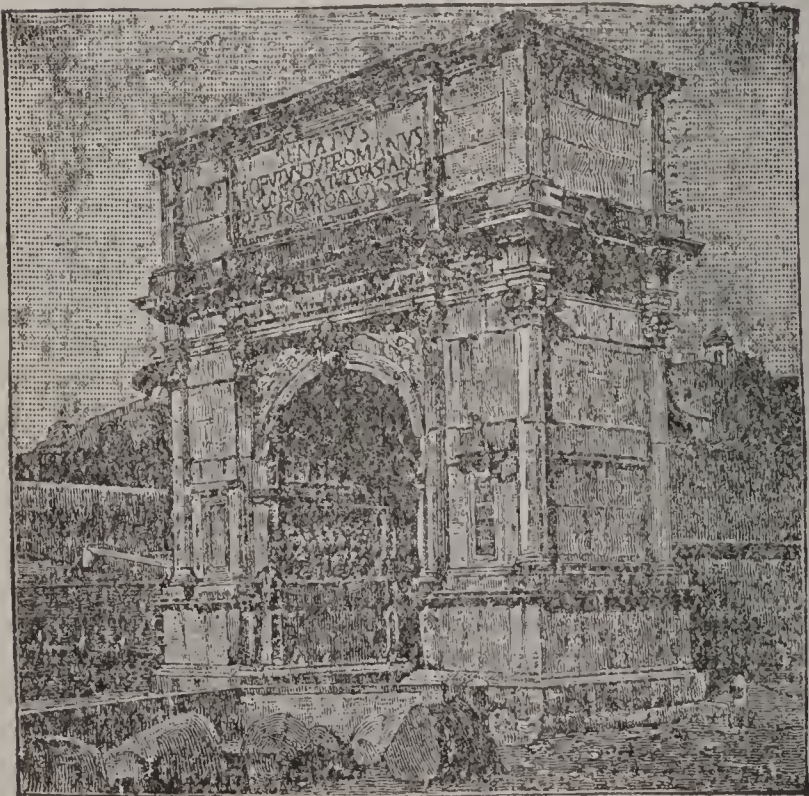
ARAL, *âr'al*, LAKE: second in size only to the Caspian Sea, in the steppes of Asia; separated from the Caspian by the plateau of Ust-Urt. It lies wholly within the limits of Russian Central Asia. between 43° 42' and 46° 44' n. lat., and 58° 18' and 61° 46' e. long. It is fed by the river Sir (the ancient Jaxartes) on the n.e. side, and the Amu (or ancient Oxus) on the s.e. It is shallow, and has no outlet. Its level is 117 ft. above that of the Caspian, and 33 ft. above that of the Black Sea. Like other lakes drained only by evaporation, it is brackish. Owing to the shallowness of its waters, navigation is difficult; but Russian steamers have been launched upon it, and took part in the operations against Khiva in 1873, June. The history of the Sea of Aral is very remarkable. Sir Henry Rawlinson and Col. Yule have recently collected references made to it in Greek, Latin, Arabic, and Persian writers, and have established the fact that its present area has been dry land twice within historical times—the Jaxartes and the Oxus then running s. of the Sea of Aral to the Caspian. This was the case during the Greco-Roman period, and again during the 13th and 14th centuries. The Russian government has undertaken the restoration of the Oxus to its old bed.—See *Proceedings of Royal Geographical Society*, vol. xi., vol. xvi., and vol. i. (new series, 1879); also *The Shores of Lake Aral*, by Major Wood (Lond. 1876).



Branch of *Araucaria imbricata*.



Arcade, Romsey Church, Hampshire.



Arch of Titus.



## ARALIA.

**ARALIA**, *ă-ra'ti-ă*: genus of plants, type of the natural order *Araliaceæ*. This order is dicotyledonous or exogenous, and consists of trees, shrubs, and herbaceous plants, resembling the *Umbelliferæ* (q.v.) both in their general habit and in their botanical characters, but differing essentially in the fruit, which is not *didymous* or formed of two separable carpels as in the *Umbelliferæ*. The fruit of the *Araliaceæ* consists of several one-seeded cells, often succulent. The order contains about 160 known species, natives of tropical, temperate, and cold climates, generally possessing stimulant and aromatic properties. Poisonous qualities are not developed as in the *Umbelliferæ*. The herbage of many species affords good food for cattle, and some are used for human food. The genus *Aralia* contains a considerable number of species—trees, shrubs, and herbaceous plants. It has a succulent fruit, with 5 or 10 cells, crowned with the styles. *A. nudicaulis* is a native of the United States, a species of humble growth, having a solitary radical leaf with a trifid stalk and ovate serrated segments; the scape is shorter than the leaf. The root is said to be equal in value to sarsaparilla as an alterative and tonic. *A. racemosa*, *A. spinosa*, and *A. hispida*, also natives of N. America, produce an aromatic gum resin. *A. spinosa* is a stimulant diaphoretic. The berries, infused in wine or spirits, are employed as a cure for rheumatism. It is sometimes called Toothache-tree: it also bears the name of Angelica-tree. It is a native of moist woods in Virginia and Carolina, growing to a height of 10 or 12 ft., with a single stem, spreading head, doubly and trebly pinnate leaves and ovate leaflets, and is very ornamental in a lawn. *A. polaris*, found in the s. island of New Zealand, and in the greatest abundance and luxuriance in Lord Auckland's Islands, is described by Dr. Hooker as a 'very magnificent plant,' a herbaceous perennial, 4–5 ft. high, with large orbicular masses of green foliage and waxy flowers, presenting a very striking appearance. *A. edulis*, now called *Dimorphanthus edulis*, is employed in China as a sudorific. Its shoots are very delicate and pleasant when boiled; and the roots, which have an agreeable aromatic flavor, are used by the Japanese as carrots or parsnips are in Europe. *Aralias* abound in the warm valleys of the Himalaya. The natives collect the leaves of many as fodder for cattle, for which purpose they are of great value in a country where grass for pasture is scarce; but the use of this food gives a peculiar taste to the butter. Chinese rice paper has been ascertained to be cut from cylinders of the pith of an *Aralia*. Ginseng (q.v.), the root of a species of *Panax*, is one of the most important products of the order *Araliaceæ*. The astringent roots of *Gunnera scabra*, or Panke, are used in tanning, but its fleshy leaf-stalks are eaten like those of rhubarb. It has been seen on the sandstone cliffs of Chiloe with leaves nearly 8 ft. in diameter.—*A. nudicaulis* is known as Wild Sarsaparilla (see SARSAPARILLA); and *A. spinosa*, the Angelica-Tree, is known as Hercules Club, having thick branchlets. Our native Ginseng (q.v.), and Dwarf Ginseng (*A. trifolia*), with deep globular tuber, common at the north, belong here.

## ARALIACEÆ—ARAM.

ARALIACEÆ, n. plu. *ă-ră'li-ă'se-ŕ* [*araliă*, an American word]: the ivy family. ARALIA, n. plu. *ă-ră'li-ă*, a genus of the above, one species of which has fragrant and aromatic roots, which are used in America as a substitute for sarsaparilla. ARALIACEOUS, a. *ăr-ăl'î-ă'shŭs*, pertaining to the Aralia.

ARALO-CASPIAN, a. *ă-ră'lô-kă's'pî-ăn*, or *ă'răl-ô-*: a term applied to the extensive basin or depressed area occupied by the Aral and Caspian seas and surrounding districts of country; in *geol.*, applied to the limestone and associated sandy beds, of brackish-water origin, which have been traced over much more than the area indicated.

ARAM, *ă'răm*, EU'GENE: 1704-59; b. Ramsgill, Yorkshire. His father was a gardener, and could afford to keep A. at school only for a short time; but even while assisting his father, he contrived to gratify his passion for learning. At an early period of his life he married, and became a schoolmaster, first in Netherdale, and afterwards at Knaresborough, where he resided till 1745. In the town of Knaresborough lived one Daniel Clarke, a shoemaker, and an intimate acquaintance of A.'s. On one occasion Clarke happened to purchase a quantity of valuable goods, which he easily obtained on credit; but to the surprise of everybody, he soon after disappeared, and no trace of him could be discovered. Suspicion lighted upon A., not as Clarke's murderer, but as his confederate in swindling the public. His garden was searched, and in it was found a portion of the goods which Clarke had purchased. A. was arrested and tried, but acquitted for want of evidence. He now left his wife at Knaresborough, and went to London, and other parts of England, in his capacity of schoolmaster; and in spite of his wandering life, contrived to acquire a knowledge of botany, heraldry, Chaldee, Arabic, Welsh, and Irish, and was planning a great etymological work, to be entitled 'A Comparative Lexicon of the English, Latin, Greek, Hebrew, and Celtic Languages,' when he was suddenly dragged away from his ushership of Lynn Academy, in Norfolk, and committed to prison on a charge of murder.

In 1759, a skeleton was dug up near Knaresborough, which the inhabitants suspected to be that of Clarke, for they had now come to the conclusion that the unfortunate man had met with foul play, especially as A.'s wife had, on several occasions, made strange statements to the effect that her husband and a man named Houseman knew more of Clarke's disappearance than they chose to admit. Houseman was now confronted with a bone of the skeleton which had been discovered. He very emphatically denied that it was Clarke's. People naturally wondered how he *could* be so positive, the bones of skeletons being, to the uneducated eye, similar in appearance. They became convinced that if the skeleton was not Clarke's, Houseman must know where the latter was. At last he confessed that he had been a spectator of the murder of Clarke by A. and one Terry. He named the place where the body had been hidden. It was searched, the buried skeleton was dug up, and



## ARAMÆA—ARANDA.

A. was tried at York, for the murder of Clarke, 1759, Aug. 3. What has given extraordinary *éclat* to this trial is the fact that A. conducted his own defense. He attacked, with great acumen, plausibility, and curious erudition, the doctrine of circumstantial evidence; but to no effect, for a verdict of guilty was returned, and he was condemned to suffer death three days afterwards. In the interval, he confessed his guilt to the clergymen who attended him. While in the condemned cell, he wrote a defense of suicide; but failed in a practical illustration of the doctrine, which he forthwith attempted.

ARAMÆ'A: the whole country to the n.e. of Palestine, with boundaries, not rigorously defined, as follows: n., by Mount Taurus; e., by the Tigris; s., by Arabia; and w., by Arabia, Phœnicia, and Lebanon. It comprised the countries known to the Greeks by the various names of Syria, Babylonia, and Mesopotamia. *The Aramaic language*, a branch of the Semitic, was common to the whole country, and was divided into two principal dialects—the west Aramaic or Syriac, and the east Aramaic, or, as it is improperly termed, the Chaldee. The former was that spoken almost universally in Palestine in the time of Christ. Ever since the Babylonian captivity, the pure Hebrew, in which the whole of the Old Testament, with the exception of a few chapters in Daniel and Ezra, had been written, had gradually given place to the Aramaic. The Aramaic version of the Bible was that used in Christ's time, who quotes from it, and not from the original Hebrew; as, for instance, the beginning of Psalm xxii. repeated on the Cross. The Talmud, especially the Babylonian, has a large admixture of Aramaic elements. The Aramaic dialect is, in general, the harshest, poorest, and least elaborate of all the Semitic languages, and has now almost entirely died out, and given place to the Arabic and Persian. Indeed, it is found living only among some tribes in remote districts of the mountains of Kurdistan, and in two or three villages in Syria; yet it is considered highly probable that it is the root of the whole cluster of Semitic tongues.

ARAMAIC, a. *ār'ā-mā'ik* [from *Aram*, a son of Shem, whose earliest descendants are supposed to have inhabited the upper basin of the Tigris]: a name applied to the Syro-Chaldean language—a branch or dialect of the great Semitic family of languages. ARAMEAN, or ARAMÆAN, a. *ār'ā-mē'ān*, pertaining to the Syrians and Chaldeans or their language.

ARANDA, *á-rán'dá*, PEDRO PABLO ABARCA DE BOLEA, Count of: 1718–99; of a distinguished Aragonese family: entered at first on a military career; but having evinced a remarkable spirit of observation, he was appointed by Charles III. ambassador to the court of Augustus III., king of Poland; which post he filled for seven years. After his return, he was appointed capt.-gen. of Valencia, and in 1766 recalled to Madrid on account of its disturbed state, and the presidency of the council of Castile was bestowed on him. A. not only soon restored order in the capital, but

## ARANEIDA—ARANY.

limited the power of the Inquisition, procured the expulsion of the Jesuits from Spain, and carried the salutary terror of government into the recesses of the Sierra Morena, then infested by hordes of ferocious banditti. Like many other reformers, he was not able fully to carry out his liberal intentions. In 1773, he was removed from his high position through the influence of the clergy, the Dominican monks especially, and sent as ambassador to France. Grimaldi succeeded him in his office, and after him Count Florida Blanca; but when the latter lost his office in consequence of court intrigues, A. returned to his position; soon, however, to lose it again through the agency of Godoy, Duke of Alcudia, the queen's favorite. He, however, remained president of the council of state, which he had organized; but upon his expressing his views regarding the war with France, he was banished to his native province of Aragon, where he died in 1799.

ARANEINA: see under ARANEOUS.

ARANEOUS, a. *ă-ră'ně-űs* [L. *arānĕă*, a spider or cobweb]: resembling a cobweb. ARANEINA, n. *a-rā-nĕ-ĭ'na* the order of the spiders. ARANEIFORM, a. *ăr'a-nĕ-ĭ'-fawrm*, shaped like a spider (q.v.).

ARANGOES, n. pl. *ă-răn'gōz*: pierced beads of various forms made of rough carnelian, formerly imported from Bombay to be re-exported to Africa in the slave-trade.

ARANJUEZ, *ă-rân-hwĕth'* [a corruption of the Latin *Ara-Jovis*, altar of Jupiter]: t. in the prov. of Madrid, Spain; on the left bank of the Tagus, 28 m. s.s.e. from Madrid, in a beautifully wooded valley; connected with the Spanish metropolis by a railway. The town is built in the Dutch style and has broad and regular streets intersecting each other at right angles. It is famed for its palace and gardens. The palace was long a favorite resort in spring of the royal family, during which period A. occasionally reckoned as many as 20,000 inhabitants; the gardens were laid out by Philip II., who built a palace also, for there was only a shooting villa here during his father's time, but a fire destroyed a portion of it, and more was taken down by Philip V., who reconstructed the edifice in French style. The present château was completed by Charles IV. On account of its gardens, the natives call A. 'the metropolis of Flora.' These gardens are interspersed with numerous summer-houses, the most celebrated of which is the *Casa del Labrador*, or Laborer's Cottage; but their most splendid ornament are the great elm trees brought from England by Philip II., which thrive magnificently. They radiate out from a central plot in 12 distinct rows. A. is known historically for the treaty of alliance concluded here between France and Spain 1772, Apr. 12, and as the scene of the abdication of Charles IV. 1808, Mar. 18. Pop. 8,154.

ARANY, *ör'rőñ*, JANOS: 1817, Mar. 2—1882, Oct. 22; b. Nagy-Szalonta: next to Petöfi the most distinguished of modern Hungarian poets. His father was a poor peasant, who spared no pains to get him into the church. In 1832, he entered the college at Debreczin, where he distinguished



himself by his diligence; but unable to restrain his love of adventure, he joined, 1836, a company of strolling players, with whom he travelled about for several months, till, driven by necessity and an upbraiding conscience, he hurried home to do what he could for the support of a now blind and aged parent. At Szalonta he worked as a teacher of Latin and as a notary. When the Kisfaludy Soc. of Pesth offered a prize for the best humorous poem, A. sent in anonymously his *Az elveszett Alkotmány* (The Lost Constitution of the Past). He was successful. Thus emboldened, he ventured, 1847, to forward to the same soc. the first part of a trilogy, *Toldi*. Struck by the beauty of this purely national effort, the members published it at their own expense, and again rewarded the author. A. soon became a popular favorite, even in the lowest ranks of the community. In 1848, appeared his *Murány Ostroma* (Conquest of Murány), which received less attention owing to the political excitement of the time. The poet himself took a slight part in the revolution, but after the dismal termination of the war he was allowed to return to his country. He was afterwards professor of Hungarian literature, director of the Kisfaludy Soc., editor of a journal, and sec. of the Hungarian Acad. (1865-78). Later works are *Katalin* (1850), the third and second parts of *Toldi* (1854-79), *Buda Halála* (1864), and a humorous poem recounting his early adventures (1874). Part of *Buda* has been translated into English.

ARAPAIMA, *är-ä-pī'mă*: genus of fresh-water fishes, the largest known fresh-water fishes in the world. They are found in the rivers of S. Amer., and are sometimes taken in the Rio Negro 15 ft. in length, and of the weight of 4 cwt. They are taken with the harpoon, and are highly esteemed for food, both fresh and salted. In the salted state, they have begun to form an article of commerce, and are conveyed in large quantities to Para. The genus *A.* belongs to the family of *Clupesocidæ*, a family of malacopterous fishes, allied to the *Clupeidæ* or herring family, and is remarkable for the mosaic work of strong, bony, compound scales with which the body is covered. About six species are known.

ARARAT, *är'a-răt* [*Airarat*, in the old Armenian dialect; i.e., the plains of the Aryans]: ancient name of the fertile plateau through which flows the river Aras or Araxes. It occupies the centre of the mountainous region of Armenia, belonging partly to Turkey and partly to Russia. Notwithstanding the passage Gen. viii. 4, where it is said that the ark rested 'on the mountains of Ararat,' it has become common to give the name *A.*, not to the entire range, but to the mountain called by the Armenians *Massis Leusar*—i.e., 'mountain of the ark' (known among the Turks as *Aghri-Dagh*, 'steep mountain'; and among the Persians as *Koh-i-Núh*, 'Noah's mountain'). It rises in two volcanic cones, known as the Greater and the Lesser Ararat; the former, 17,212 ft. above the sea, is covered with perpetual snow. It is the highest elevation of Western Asia; and since the war of 1827 it forms the point where the Russian, Turkish, and Persian territories meet. In 1840, the form of the mountain

## ARAS—ARATUS.

was partially changed by a frightful and destructive earthquake. Previous to this period, at the base of the mountain, and at a point where a stream runs from a wild gorge, there stood the village of Arguri or Aguri, surrounded by gardens and orchards, with upwards of 1,000 inhabitants. In the ravine, 2,300 ft. above the village, stood the Armenian convent of St. James; and 1,000 ft. higher still, a chapel dedicated to St. James. The beauty and mild air of the district made Anguri a favorite summer resort of the richer inhabitants of Erwan. It was to undergo a great change, however. On June 20, 1840, dreadful shocks of earthquake were felt. Great masses of the mountain were thrown into the plain, the ravine was closed, the convent and chapel disappeared, and the village, and the gardens which surrounded it, were buried under rocks, earth, and ice, and with the inhabitants utterly destroyed. Tournefort made a partial ascent of the mountain in 1700; since then, ascents have been made in 1829 by Professor Parrot of Dorpat and his companions; in 1850 by Colonel Chodzko, and a large party of Russians engaged in the Transcaucasian triangulation; in 1856 by Major Robert Stuart; and in 1870 by Dr. G. Radde and Dr. G. Sievers. These naturalists, the former of whom is director of the museum at Tiflis, have carefully explored the mountain and district in which it is situated. See their '*Reisen in Armenschen Hochland*' (*Petermann's Mittheilungen* for 1871); also the *Transcaucasia and A.* of Mr. Bryce, who made the ascent in 1876.

ARAS, *ār'as*: the ancient *Araxes*, a river of Armenia, formed by the junction of the Bingol-Su and the Kaleh-Su, and uniting its waters with those of the Kur (ancient *Cyrus*) after a course of about 500 miles. The main stream is the Bingol-Su, which rises in the Bingol-Tagh, lat. 41° 30' n., and long. 41° 10' e.; and flowing n.n.e., is joined a little below Hasan-kaleh by the Kaleh-Su, after which the combined stream is called the A. It then flows e., forming for some time the s. boundary of the province of Kars, till it is joined by the Arpa, which flows into it from the north. After this, it divides Russian and Turkish Armenia; at some distance to the s. of Erivan it turns to the s.e., along the base of Ararat; soon after which it receives the waters of the Zenghi, a river descending s. past Erivan. Near Djulfa it runs e. for about 60 m.; after which it runs to the n.e. for upwards of 125 m., till it is joined by the large river Kur, descending from the Caucasus through Georgia. Their united waters, after a short e. course, turn suddenly to the s., and fall by three mouths into the Gulf of Kizilgatch, in the Caspian, in lat. 39° 20' n.

ARATUS, *á-rā'tūs*, OF SICYON: a distinguished Greek statesman; b. abt. B.C. 271. His youth fell among the party strifes of his native town, in which his father, Clinias, met his death; and he himself was only saved by the efforts of his aunt, who had him secretly conveyed to Argos, whence he returned, in his twentieth year, and liberated Sicyon from its tyrant, Nicocles, B.C. 251. Supported by Ptolemæus Philadelphus, A. restored the republican form of govern-



## ARATUS—ARAUCANIA.

ment to Sicyon, and united it with the Achaian League, of which he was appointed general, B.C. 245. During his honorable but checkered career, this office was conferred on him seventeen times. His great object was to 'unite the Greek states, and form out of them an independent nation; but this was thwarted by their mutual jealousies. A. was a brave general, a skilful tactician, and a disinterested patriot. A. died by poison administered to him by command of Philip III. of Macedon.

ARATUS OF SOLI (or Pompeiopolis, in Cilicia): wrote about B.C. 270, a Greek didactic poem, entitled *Phænomena*, founded on the astronomical system of Eudoxos of Cnidos, and appended to it another poem, *Diosemeia*, giving rules for prognostication of the weather. A pure style and correct versification mark both poems, which were translated into Latin by Cicero, Cæsar Germanicus, and Rufus Festus Avienus. A. was a native of the same province as the apostle Paul, who quotes from him in his speech on Mars' Hill: 'For as certain of your own poets have said, We also are his offspring' (Acts xvii. 28). The best editions are by Buttmann (1826), Bekker (1828), and Köchly (1851).

ARAUCANIA, *ă-răw-kâ'ne-ă*: country of the Araucos or Araucanian Indians, in the s. of Chili. The Chilian province of Arauco, between the rivers Biobio and Valdivia, was incorporated 1852; but the Indians occupy a large territory in Arauco and the more s. provinces of Valdivia, and still maintain their independence of the Chilian republic. The Araucanians are interesting as furnishing the only example of Indian self-government in the presence of the European races. Their country is divided from n. to s. into four parallel regions, varying from each other, with some regularity, in soil and climate. There are the coast region, the plain region, the region of the Lower Andes, and the region of the Higher Andes. The productions of A. are similar to those of Chili. The pop. cannot be accurately estimated on account of the independence of the nation; but the most recent estimates of the aboriginal population are from 10,000 to 50,000.

A. has the proud distinction of being the only portion of the new world that has never received the European yoke. From the days of Pizarro and Almagro downwards, it has uniformly vindicated its freedom—its wars of independence having lasted, with intervals of precarious truce, from 1537 to 1773. In 1861, a French adventurer, De Tonneins (1820–78), ingratiating himself with the Indians, was elected king of A. See his *L'Araucanie* (Bord. 1878); R. Smith's *Araucanians* (New York, 1855); and Medina's *Aborijenes de Chile* (Santiago, 1882).

## ARAUCARIA.

ARAUCARIA, *ăr-aw-kā'rĭ-ă*: genus of plants of the natural order *Coniferæ* (q.v.) or Pines, consisting of lofty trees, natives of the s. hemisphere, and distinguished by having the male and female flowers on separate plants, the pollen of the male flowers contained in 10-20 cases pendent from the apex of each scale, the female flowers two under each scale; each having one ovule. The species are all evergreen, the leaves broader than in pines and firs, which the trees resemble in their general manner of growth. *A. imbricata*, sometimes called the CHILI PINE, a native of the Andes of Chili, forming forests on their w. declivities, attains a height of 150 ft., the trunk quite straight and free from knots.



*Araucaria imbricata*:

End of a branch, much reduced, showing the mode of ramification, and the manner in which the leaves are imbricated.

The bark of the young trees is studded with leaves from the base upwards, even until 12 or 15 years of age. The branches are in whorls of 6, 7, or 8. Young trees have branches almost from the ground; old trees have tall naked stems, with a crown of branches. The female strobile (cone) is roundish ovate, 8-10 inches in diameter, the scales terminated by a long awl-shaped point, the seeds wedge-shaped, and more than an inch in length. The outer and inner bark of full-grown trees are each 4-6 inches in thickness; the outer bark of a corklike texture; the inner, fungous and porous. From both outer and inner bark, and indeed from all parts of the tree, resin flows readily and in great abundance. The leaves are lanceolate, about  $1\frac{1}{2}$  inch in length and  $\frac{1}{4}$  inch in breadth near the base, sharp-pointed. The timber is heavy, solid, hard, fibrous, yellowish white, and beautifully veined. It is very suitable for masts of ships. The resin, which is white, has a smell like frankincense, and a not unpleasant



## ARAUCARIA.

taste. It is applied as a plaster to contusions. The seed is pleasant to the taste, not unlike the chestnut, and is a most important article of food to the Indians. It is eaten raw, boiled, or roasted. A spirituous liquor is also distilled from it. A single strobile sometimes contains between 200 and 300 seeds, and one tree may be seen loaded with 20 or 30 of these great strobiles. This *Araucaria* was introduced into Britain in the end of the last century, and is now frequently planted. It promises to add—like the larch and the spruce—



*Araucaria imbricata*: Sketched in the Botanic Gardens, Edinburgh.

a new feature to British landscapes, and will probably prove important in an economical point of view. *A. Brasiliana*, the BRAZIL PINE, has loosely imbricated lanceolate leaves, and a looser and more spreading habit than *A. imbricata*. The seeds or nuts are sold as an article of food in Rio Janeiro. The resin which exudes from the tree is mixed with wax to make candles. *A. excelsa*, now called *Eutassa excelsa* (and by some *Altingia*), the NORFOLK ISLAND PINE, a native of Norfolk Island, New Caledonia, etc., attains a height of 160–220 ft., free from branches to 80–100 ft., and with a trunk sometimes 11 ft. in diameter. The wood is white, tough, close-grained, and so heavy as almost to sink in water. The leaves of the young trees are linear and spreading; those of the adult are ovate, and closely imbricated. The strobiles are ovate, 4–5 inches in length. *A. Cunninghamii*, now also ranked in the new genus *Eutassa* or *Altingia*, the MORETON BAY PINE, a native of the shores of Moreton Bay and banks of the Brisbane river in New South Wales, very much resembles the last. It attains a height of 60–130

## ARAUCHARITES—ARAVULLI.

ft., and a diameter of 4–8 ft. The leaves of the adult trees are lanceolate and imbricated. The wood is yellowish, and is used for boat-building, house-carpentry, and the common kinds of furniture. The large seeds of *A. Bidwillii* are used for food by the natives at Moreton Bay.

Certain fossil *Coniferæ* found in carboniferous sandstone have received the name *Araucarites*. Livingstone found a forest of large silicified trees near the Zambesi, which Mr. Quekett, on examination of specimens, ascertained to be 'silicified coniferous wood of the Araucarian type.' Fossil trees of the same type occur in the carboniferous strata of Britain. The woody fibre exhibits rows of dots that alternate with dots of other rows, unlike other pines.

ARAUCHARITES, n. plu. *ă-row'kăr-îtz* [*Arauca'riăn*, an Indian tribe of Chili]: in *geol.*, the fossil wood whose structure is identical with that of the living AR'AUCA'RIÆ, *-kă'ri-ē*—trees, natives of the southern hemisphere.

ARAUJO DE AZEVEDO, *ă-row'zho dă-ză-vă'do*, ANTONIO DE, afterwards Count da Barca: 1754, May 14—1817 June 21; b. Sá, near Ponte de Lima, Portugal. At the age of 11, he was sent to Oporto to study under his uncle, who held a high military command. In 1787, he was appointed Portuguese ambassador to the Hague. Before entering on his duties, he visited England, where he omitted no opportunity of obtaining a knowledge of English manufactures, commerce, politics, etc. Then he employed himself similarly in Paris.

At length he resigned his ambassadorship (for the political complications, see under PORTUGAL—*History*) and travelled through Germany, enlarging the sphere of his studies in various departments, scientific and literary. After the Peace of Amiens, A. was sent as ambassador to St. Petersburg; in 1803, he was recalled to Lisbon, to assume the office of sec. of state; and in 1806 he obtained the highest political dignity in the kingdom. His efforts to introduce the various agencies of civilization, while he occupied this situation, were unremitting. But the sudden approach of the French army put an end to all his improvements. The royal family, which Bonaparte had formally dethroned in his victorious proclamation, emigrated to Brazil. A. embarked also, taking a complete printing apparatus, his mineralogical collection, arranged by Werner, and all necessary chemical instruments. During the first years of his residence in Brazil, he devoted himself assiduously to scientific and literary pursuits; founded a school of medicine and chemistry, introduced the cultivation of tea, an improved machine for sawing wood, and a sugar-alembic, and established a porcelain manufactory. He had also a magnificent garden, the plants of which were scientifically arranged.

ARAURE, *ă-row'ră*: t. of Venezuela, S. America; lat. 9° 17' n., long. 69° 28' w.; 60 m. e.n.e. of Trujillo, in a region noted for its fertility in the production of cotton, coffee, cattle, etc. Pop. 10,000.

ARAVULLI, *ăr'a-vŭllē*: range of mountains in w.

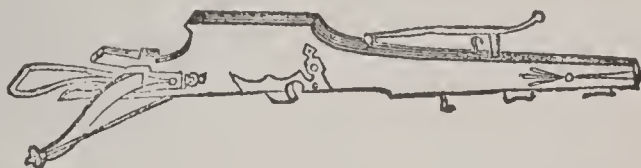


## ARBACES—ARBALEST.

India; from about 22° 40' n. lat., 74° e. long., to 26° 50' n. lat., 75° e. long. The highest summit is Abu (q.v.). The n.e. extremity of the range sinks into comparatively low rocky hills. The n.w. side is very bold and precipitous, the s.e. less so. There is no road practicable for wheel-carriages across this range for a distance of 220 m.

ARBACES, *ár-bā'sīz*: founder of the Median empire, B.C. 876. He was one of the generals of Sardanapalus, king of Assyria, and had command of the contingent from the prov. of Media. He conspired with Belesys, a Chaldæan priest, who commanded the troops from Babylon, and having gained over several other officers of the king, they revolted. After a short contest, Sardanapalus was defeated, and committed suicide. The dynasty founded by A. lasted till its overthrow by Cyrus, B.C. 559. Arbaces, the Mede, is to be distinguished from the satrap of the same name who commanded a division of the army of Artaxerxes in his war with his brother Cyrus.

ARBALEST, *ár'bā-lēst*, or ARBALIST, n. *-līst*, or ARBLAST, n. *ár blāst*, or AR CUBALIST [L. *arcus*, a bow; *balis'ta*, an engine for throwing stones or darts]: in *OE*, a crossbow. ARBALISTER, n. *ár bā līs'tér*, a crossbow-man. The A. or Crossbow was a weapon much in use in feudal times. Its recognized position among military arms dated from about the period of Richard I. The smaller kinds of A. were bent



Arbalest.

by pressing the hand on a small steel lever called the 'goat's foot'; but the larger kinds were bent by placing the foot in a loop or stirrup at the end of the central shaft, and drawing the cord upwards with the hand. At a later period, the bow was made very strong, often of steel; in this form it required a mechanical contrivance, called a 'moulinet,' to bend it. Sometimes ordinary arrows were used with the A., but more usually arrows of a shorter and stouter kind, called 'carrials' or 'quarrels,' were employed; these had a four-sided pyramidal form of head. Occasionally stones and leaden balls were shot from the larger Arbalests. The arbalisters, or crossbow-men, carried a quiver with fifty arrows as an armament in some of the battles of the 13th c. They were an essential component of armies of that period, taking up their position in the van of the battle-array; some were mounted, some on foot, and they occasionally wore armor. The supply of arrows or quarrels was carried after them to the battle-field in carts. The A. continued to be a favorite weapon in England throughout the 13th c.; but in the 14th, it gave way to the long-bow, which was found more convenient in battle. For the long-bow, see

## ARBALESTINA—ARBITRAGE.

BOW AND ARROW; for the military system to which it belonged, see ARCHERS AND ARCHERY.

ARBALESTINA: in the military system of the middle ages, a small window or wicket through which the cross-bowmen shot their quarrels or arrows at an enemy besieging a fortified place.

ARBELA, *är-bē'lâ*, now ERBIL or ARBIL: a small t. of Assyria, e. from Mossul, famous as having given name to the battle in which Alexander finally defeated Darius, B.C. 331. The battle was really fought near Guagamela (the 'camel's house'), to the n.w. of A.

ARBITER, n. *är'bī'tér* [L. *arbiter*, an umpire or judge. Fin. *arpa*, a lot or symbol]: one appointed to settle a matter in dispute between two or more persons; one intrusted with the power of decision or regulation. ARBITRAMENT, n. *är'bīt'ră-měnt*, decision; determination. ARBITRABLE, a. *är'bī-tră-bl*, determinable. ARBITRAL, a. *är'bī-trăl*, of arbitration. ARBITRARY, a. *är'bī-trér'ī*, despotic; tyrannical; guided by will only. AR'BITRAR'ILY, ad. *ī-lī*, with no other rule or guide than the will. AR'BITRAR'INESS, n. the quality of being tyrannical or despotic. ARBITRATE, v. *är'bī-trāt* [L. *arbitrātus*, pronounced upon, as a dispute]: to hear and decide in a disputed matter; to determine. AR'BITRA'TING, imp. AR'BITRA'TED, pp. ARBITRATION, n. *är'bī-tră'shūn*, the hearing and deciding of a disputed matter by one or more persons. ARBITRATOR, n. *är'bī-tră'tér*, a person chosen to decide a dispute; he who, or that which, puts an end to a thing; an arbiter. ARBITRESS, n. *är'bī-trēs*, or ARBITRATRIX, n. *är'bī-tră'trīks*, a woman who decides.—SYN. of 'arbiter': arbitrator; umpire; controller; governor; ruler; judge; referee;—of 'arbitrary': absolute; despotic; tyrannical.

AR'BITRAGE: term used for the comparison and settlement of disputed accounts, and the composition of business, or trade disputes. The expression is applied, e.g., to the adjustment of prices of any commodity simultaneously in two or more markets, in terms of the quotations employed in a given locality, the difference of exchange being calculated. It is also applied to business done on the basis of such calculations, as by making purchases in whatever is for the moment the cheapest market, and selling in the dearest; in this sense it is used in traffic in bills and exchange, in coin and bullion, and in stocks, as well as in commodities.



## ARBITRATION.

**ARBITRATION:** adjudication by private persons appointed to decide a matter, or matters in controversy, or a reference made to them for that purpose, either by agreement of the disputants or by the order, or on the suggestion, of a court of law. The proceeding generally is called a *submission to arbitration*, or *reference*; the parties appointed to decide are termed *arbitrators* or *referees*; and their adjudication is called an *award*. This mode of settling disputes is not only frequently resorted to by litigants themselves, who are anxious to avoid the delay and expense of proceedings in the public tribunals, but the statute-books bear witness to the approval of it by the legislature at various times, and there are recent statutes rendering A., or private reference, in certain cases compulsory. International arbitration has been of late repeatedly resorted to in matters of debate between nations. Thus as between the United States and Britain, the San Juan boundary question and the Alabama (q.v.) dispute were so arranged. Diplomatic conferences, which often obviate war, belong to a different category. See LONDON CONFERENCES.

The matters that may be determined by an arbitrator are all personal disputes and differences which might otherwise be made the subject of controversy in the courts of civil jurisdiction. Thus breaches of contracts generally, breaches of promises of marriage, trespass, assaults, charges of slander, differences respecting partnership transactions or the purchase price of a piece of property, all may be referred to A. Questions relating to real property may also be referred, such as those relating to the partition of lands of joint tenants or tenants in common, to settlements of disputed boundaries—to differences between landlord and tenant respecting waste—and to the title to land. Pure questions of law may also be referred to the decision of an arbitrator. An arbitrator may have, therefore, to determine the liability of a party on a promissory-note or bill of exchange, or to construe an act of the legislature, or to give a judicial opinion on the effect of a will or deed. Actions at law, and suits in equity, may also be settled by A.; and this kind of reference may be made at any stage of the proceedings, sometimes even after the verdict, and probably by analogy, after decree in equity. Questions relating to the future use and enjoyment of property, and future or anticipated differences between parties, may likewise be referred. In some of the states, however, some matters depending on points strictly technical are excluded from A., in view of the fact that arbitrators often are not learned in the law.

A matter, however, clearly illegal, cannot be made the subject of a valid reference. But where transactions between parties have been brought to a close by a general award, apparently good, the courts have refused to reopen them on a suggestion that some legal item had been admitted in account.

It is not the policy of the law to refer to A. felonies and offenses of a public nature; because the public safety requires them to be punished, and for this purpose they can

## ARBITRATION.

be properly tried only in one of the ordinary courts of the country.

Yet there are certain misdemeanors which may be settled either by agreement or by means of an A., on a principle of very general application which has been well stated—that where there is a remedy, by action as well as by indictment, a reference of the matter in controversy is good. And in these cases of misdemeanor, a compromise or settlement under a reference may be made, even after conviction, but with the sanction of the court.

As to the parties who may make a reference to A., it may be stated generally, that every person capable of making a disposition of his or her property or release of rights, may make a submission to an award.

Partners and corporations may make references to A. on the principles above noted, and according to the relation in which they stand to the matter in dispute.

As to a reference to A. by act of counsel, aside from client, formerly advocated by high English authority, the feeling of the bar in England now is that it is unwise to refer or compromise a litigation on the independent authority of counsel.

Disputes may be referred to A. in any manner that expresses the agreement or understanding of the parties to be bound by the decision of the arbitrator; and for this purpose no formal submission, either verbal or written, is necessary; but the arrangement must be such as manifestly to show an intention to have the difference concluded by a private adjudication in the nature of an award. But where the submission is in writing, it must be executed in due form. A testator, however, cannot exclude his will from litigation by a proviso, that all differences respecting it shall be referred to A., although it is thought that the parties benefited by the will might themselves so refer. Generally speaking, it is advantageous to make the A. in such a form as that the award may be made a rule of court—that is, may be adopted by a court of law as its judgment on the matter submitted, a proceeding that affords an obvious facility in enforcing the award.

The arbitrator ought to be a person who stands perfectly indifferent between the disputants; but there are no other particular qualifications for the office. And the choice by parties of the person who they agree shall decide between them is perfectly free. Some legal writers have even gone so far as to maintain, that not only infants and married women, but even idiots and lunatics, can be arbitrators, on the argument that every person is at liberty to choose whom he likes best for his private judge, and he cannot afterwards object to the deficiencies of those whom he has himself selected. But this, it is clear, is going too far, and the policy of the law would certainly be interposed against such extreme cases. It is better to state the rule to be that on the condition that the party selected is of ordinary intelligence, the choice of an arbitrator is absolutely unfettered. The only exception to this rule is the case of a party who, by office or position, is the person pointed out for the duty under a reference made by statute. In matters of compli-



## ARBITRATION.

cated accounts, mercantile men are generally preferred. In other cases, it is usual to appoint lawyers, who, being accustomed to judicial investigations, are able to estimate the evidence properly, to confine the examination strictly to the points in question, and, in making the award, to avoid those informalities in respect of which it might afterwards be set aside. Both time and expense are thus saved by fixing on a professional arbitrator. It has, indeed, been wisely remarked, that an arbitrator should endeavor to arrive at his conclusions upon the same rules and principles which would have actuated the court for which he is substituted—a rule of conduct that obviously points to the expediency of a lawyer being the referee. But an arbitrator is not bound by the mere rules of practice which prevail in the ordinary courts of justice, and he has been held justified in allowing interest on both sides of an unliquidated account, although such a determination was against the practice of the Court of Chancery, where the suit which had been referred had been commenced.

The proceedings before an arbitrator are regulated according to the peculiar circumstances of the case submitted, but generally it is advisable to conduct them according to the forms observed in courts of law, and they usually are so conducted. Each of the parties furnishes the arbitrator with the statement of his case, which is done by giving him a copy of the briefs on each side; and on the day appointed he proceeds to hear them (either in person or by their counsel or attorneys), and to receive the evidence on each side, nearly in the same manner as a judge at an ordinary trial. Having so heard the case, the arbitrator proceeds to make his award, which need not necessarily be in writing, for a verbal award is perfectly valid; but in practice it is usual for the arbitrator to make written award which he delivers to the successful party. The unsuccessful party also gets a copy of the award. This award in its effect operates as a final and conclusive judgment respecting all the matter submitted, and it binds the rights of the parties for all time.

An award may be set aside on the ground of corruption and fraud in the arbitrator, and for any material irregularity or illegality appearing on the face of the proceedings. But the tendency of the courts is to favor arbitrations and maintain awards, unless such serious grounds as are above referred to can be substantiated.

Where there are two arbitrators, the submission often provides that in the case of their differing in opinion the matter referred shall be decided by a third person, called an umpire, who is generally appointed under a power to that effect, by the arbitrators themselves. But they cannot make such an appointment unless specially authorized so to do by the terms of the submission. This umpire rehears the case, and for this purpose is invested with the same powers and bound by the same rules as the arbitrators.

In A., from the nature of the case, there can be no appeal on the merits of the dispute to any public tribunal.

## ARBITRATION.

**ARBITRATION, INTERNATIONAL:** a substitute for war which in our times is receiving strong support from leading minds in Great Britain and the United States. Since 1816, there have been many arbitrations between different European nations, the United States, and the states of Central and South America, in all cases with practically satisfactory result.

Much has been done for the principle of A. by the Assoc. for Reform and Codification of the Laws of Nations (now known as 'The International Law assoc.'), organized at Brussels 1873, whose membership is drawn from all the chief nations and represents the highest standard of ability, learning, and public spirit, and which 'aims to promote international arbitration, to conserve the peace of the world,' etc. The International Peace soc. also has labored effectively for the same object. For notable instances of A. in controversies between the United States and Great Britain, see **GENEVA ARBITRATION: VENEZUELAN QUESTION.** After long correspondence between the Marquis of Salisbury and Secretary of State Olney, a General Arbitration Treaty between Great Britain and the United States was agreed on, and, 1897, Jan. 11, submitted to the U. S. senate, where it was finally defeated, May 5. In 1898 the U. S. and Canada agreed to submit to a joint high commission all questions at issue between them, including those of the Alaskan boundary, war vessels on the lakes, reciprocity of trade, and fisheries. Prolonged sessions were held at Quebec and Washington and substantial progress was made in the settlement of many of the questions, but the commissioners were unable to agree upon that of the Alaskan boundary. In 1899 a provisional boundary was agreed upon, a *modus vivendi* was signed, and negotiations ceased. In 1903 this last serious difference with Great Britain was adjusted; a treaty signed by Secretary Hay and Ambassador Herbert referring the question to a mixed commission of 6 jurists. Meanwhile the most important advance in the history of A. had been made. In 1899 the International Peace Conference at The Hague established a permanent court of A. This body is composed of 4 persons of recognized competence in questions of international law, from each of the 15 leading nations of the world, who serve for 6 years or longer. From these arbitrators each of the powers on the brink of war may select 2 and they shall choose together an umpire.

**ARBITRATION, LABOR.** On Dec. 17, 1901, a conference of representatives of capital and labor was held in New York city under the auspices of the National Civic Federation, out of which grew the establishment of a Court of Labor for the settlement of differences between employers and labor unions. The board consists of representatives of the general public, of employers, and of organized labor, and was made the industrial department of the National Civic Federation.



## ARBOGA—ARBORESCENT.

**ARBOGA**, *ar-bo'gá*: ancient city in Sweden, prov. of Westmannland, on a small river of the same name, by which, with the aid of a canal, the lakes Hialmar and Mälar are united. A. was an important commercial town, but has now sunk into insignificance, having only an historical interest from the antiquities in its neighborhood. Of all its churches, cloisters, and chapels there remain only the town and parish churches, the former with an altar-piece of Rembrandt's. Several kings of the family of Vasa have resided here. Church assemblies were held here in 1396, 1412, 1417, 1423, 1474; diets in 1435, 1440, 1471, 1529, and 1561, in which last year also certain articles, known as the A. Articles, were passed, by which Eric XIV. was enabled to limit the power of the nobles; and in 1625, Gustavus Adolphus issued an edict here, commanding that the copper coin of the realm should contain its full worth of copper. Pop. (1890) 4,576.

**ARBOR**, n. *ár'bér* [L. *arbor*, a tree: OE. *herbere* (*hér'bēr*), a garden]: a seat shaded with trees; a bower; an axis or spindle. **ARBORATOR**, a. *ár'bō-rā'tēr*, one who grows trees. **ARBORED**, a. *ár'bērd*, furnished with an arbor. **ARBOROUS**, a. *ár'bō-rūs*, or **ARBOREOUS**, a. *ár-bō'rē-ūs*, resembling or belonging to a tree. **ARBORESCENT**, a. *ár'bō-rēs'ēnt* [L. *arbores'cens* or *ar'borescen'tem*, growing to a tree]: branched like a tree; having crystallizations disposed like the branches of a tree; in moss-like aggregates like the frost-flowers on a window-pane; becoming woody. **ARBORES'CENCE**, n. *-sēns*, or **ARBORIZA'TION**, n. *-ī-zē'shūn*, the resemblance of a tree in minerals; groups of crystals in the form of a tree. **AR'BORET**, n. a small tree; a shrubbery. **ARBORETUM**, n. *ár'bō-rē'tūm* [L.]: a place for cultivating rare trees and shrubs. **ARBORICULTURE**, n. *ár'bōr-ī-kūlt'ūr* [L. *cult'ura*, tillage]: the art of planting and managing trees and shrubs. **AR'BORICULT'URAL**, a. *-ūr-āl*, pertaining to. **AR'BORICULT'URIST**, n. *-kūlt'ūr-īst*, one who. **AR'BORIST**, n. one who studies trees.

**AR'BOR DAY**: in the United States, a day in each year, set apart by legislative enactment or otherwise, for voluntary planting of trees by the people. The custom was started in Neb. 1874, and was observed (1903) in 35 states, in nearly all of which the planting was done by public-school children with appropriate exercises.

**ARBORES'CENT**: term applied to plants to signify that they possess either altogether, or in some measure, the character of trees. Even the dwarf willows and birches, on the confines of polar or alpine perpetual snow, are described as the A. vegetation of these regions.

## ARBORICULTURE.

ARBORICULTURE, *âr' bér-î-kûl'tûr*: art of planting and raising trees and shrubs for useful or ornamental purposes, but not including the cultivation of fruit-trees, which comes under the head of Horticulture (q.v.).

The ancient Egyptians, Greeks, and Romans practiced A. to a very limited extent. Germany seems to have been the first country to plant timber-trees in a systematic manner, beginning in the 15th c. Great Britain followed in the next c., but on only a small scale. The early English laws (see FOREST LAWS) were framed for preserving game, and not specially for maintenance of timbered lands, whose area diminished as population increased. As larger quantities of timber were required for building purposes, importations soon became necessary. Evelyn's great work *Sylva* (1664) stimulated tree-planting, particularly in the ornamental line, and in the 17th c. nurseries for propagation of such trees were established. In the next c. considerable attention was given to A. in Scotland and Ireland, and early in the 19th c. the demand for ship-timber led to extensive planting of trees for that purpose. After the overthrow of Napoleon, this demand was lessened and the culture of forest-trees was neglected, though that of ornamental trees and shrubs, particularly of varieties from abroad, was increased. Societies have been formed in Great Britain for encouragement of A., and in India tree-growing is largely under govt. supervision; but Germany gives it greater attention than any other nation.

Until recently, little was done in the United States in planting timber-trees. The need of protection of crops and live-stock led many farmers, particularly at the west, to plant lines or belts of trees for wind-breaks; and the establishment of arbor day (see ARBOR DAY), and the work of the newspaper press in calling attention to the dangers threatened by the destruction of our forests, have given a great impetus to A. in a large portion of the country. Trees for planting are obtained often from swamps or upland woods; but much finer and in the end more profitable specimens can be obtained from seed. The leading nurseries supply some of the best varieties of timber-trees, but some planters prefer to grow what they require. The seed must be planted in good and carefully prepared soil, and for a few years the trees need careful culture and protection from the various enemies to which they are exposed. They should be transplanted once or twice before being placed where they are finally to stand, but they should be put in their permanent positions when not more than three or four feet in height. The transplanting of large trees is difficult, and seldom gives satisfactory results. Small trees suffer much less than large ones when removed, and, if placed in good soil and carefully cultivated for a few years, will make a far more rapid and healthful growth than large specimens. The varieties of trees for planting should be selected with reference to their adaptation to the climate and soil. Some kinds which thrive in cold regions do not thrive where the summers are long and hot; some will safely endure ex-



posure to winds and sea-air, which would be ruinous to others; and the success or failure of a variety is determined often by the degree of moisture in the soil. To a certain extent, however, the soil can be fitted, by draining and manuring, for the production of trees to which it is well adapted; and by planting in sheltered places it is often possible to grow fine specimens of half-hardy trees far beyond their natural limits. The cultivation of trees for strictly ornamental purposes properly comes under the head of Landscape-gardening (q.v.) Copse or coppice wood, largely grown in England, is subject to different treatment from that given to timber or ornamental plantations: see COPPICE: TREE.

ARBORVINE, *âr'bër-vîn* [L. *arbor*, a tree; *vinëa*, a vine]: a sort of bind-weed.

ARBOR VITÆ, *âr'bör vî'tē* (*Thuja*): a genus of plants of the natural order *Coniferæ*, allied to the cypress; consisting of evergreen trees and shrubs with compressed or flattened branchlets—small, scale-like, imbricated leaves—and monœcious flowers, which have 4-celled anthers, and the scales of the strobiles (or cones) with two upright ovules.—The common A. V. (*T. occidentalis*) is a native of N. Amer.,

especially between lat. 45° and lat. 49°, but has long been well known in Europe. In some localities it forms a tree of 40–50 ft. high; its branches are horizontally expanded, and the strobiles (cones) small and obovate. It is the parent of many varieties, some of which are extensively propagated in nurseries in the n. U. S. to be planted for ornamental purposes either singly in lawns or in the form of a hedge. (See HEDGE.) The wood of the stem is reddish, soft, and very light, but compact, tough, and durable, bear exposure to the weather remarkably well and is useful for fence posts. It is very common in Britain, but planted



Arbor Vitæ (*Thuja occidentalis*):  
End of branch, showing mode of  
ramification and fruit.

chiefly as an ornamental tree, and seldom attaining so great a size as in its native country. It thrives in cool, moist situations. The CHINESE A. V. (*T. orientalis*), native of China and Japan, immediately distinguishable from the former species by its upright branches and larger, almost globose and rough strobiles, is also in Britain, and upon the continent of Europe, a common ornament of pleasure-grounds; but it

## ARBROATH—ARBUTE.

does not attain so great a size as the preceding, and is more sensitive to the cold of severe winters. The balsamic smell is very agreeable. The tree yields a resin, having a pleasant odor, to which high medicinal virtues were formerly ascribed; hence the remarkable name, *Arbor Vitæ* (Latin, signifying Tree of Life), given to this species, and extended to the genus. Other species are known, but they are less important than these. In its native country, this species also attains the size of a considerable tree.—There are several other species of *Thuja*, some of which seem well suited to the open air in the climate of Britain and the n. United States, and others require the protection of greenhouses. Among the former are *T. plicata*, from Nootka Sound; and *T. dolabrata*, native of Japan, a tree of great height and thickness, and which will probably prove the most important of the whole genus.—A tree, common in N. Amer., and there known by the name of WHITE CEDAR, is sometimes included in the genus *Thuja*, under the name of *T. sphæroidea*, but is more generally ranked in the genus *Cupressus* as *C. thyoides*. See CYPRESS. The timber is highly esteemed, and an infusion of the scrapings is sometimes used as a stomachic. Closely allied to the genus *Thuja* is *Callitris*. See SANDARACH.

ARBROATH, *âr'brôth*, ABERBROTH'WICK, or ABERBRO'THOCK: seaport town in the e. of Forfarshire, at the mouth of a stream called the Brothock. Pop. (1894), parliamentary burgh, 22,960. Here King William the Lion founded a Tyronensian abbey in honor of Thomas à Becket, 1178. The king was interred in it, 1214. In the abbey, Bruce and the Scottish nobles met in 1320, to resist the claims of Edward II. to Scotland. Cardinal Beaton was the last of its abbots. Next to Holyrood, the abbey was the most richly endowed monastery in Scotland. It was destroyed by the Reformers in 1560. Its ruins—which are cruciform, 270 by 160 ft.—are very picturesque, presenting lofty towers, columns, Gothic windows, and a fine circular e. window, 'the Round O of A.' The chief industries of A. are flax spinning, jute-spinning, and the manufacture of sail-cloth. The new harbor, begun 1841, admits vessels of 400 tons; it is protected by a breakwater. Serious damage was done to the wet-dock entrance in 1882 by a gale and high tide. In 1880, above 40 vessels belonged to the port. The chief exports are grain, potatoes, fish, pork, and pavement, chiefly from quarries 8 or 10 m. inland. A. is a royal burgh, and in conjunction with Montrose, Brechin, Forfar, and Bervie burghs, returns one member to parliament. A. is supposed to be the Fairport of *The Antiquary*, and the Redhead Crags and Coves form some of the scenes in that novel. The famous Bell-rock Light-house is 12 m. s.e. of A.

ARBUSCLE, n. *âr'bŭs-sl* [L. *arbus'cula*, a small tree]: a dwarf tree; a small shrub with the appearance of a tree, as many heaths. ARBUSCULAR, a. *âr-bŭs'kŭ-lér*, shrub-like. ARBUSTIVE, a. planted with shrubs or trees; containing copses of shrubs or trees.

ARBUTE, n. *âr'bŭt* [L. *ar'bŭtus*]: the strawberry tree. ARBUTEAN, a. *âr-bŭ'tĕ-ăn*, pertaining to.



## ARBUTHNOT—ARBUTUS.

**ARBUTHNOT**, *ár'bŭth-not*, JOHN: d. Hampstead, 1735. a distinguished writer and physician, contemporary and friend of Pope and Swift: son of a Scottish Episcopal clergyman; born at Arbuthnot, Kincardineshire, shortly after the Restoration. He studied medicine at Aberdeen; and, removing to London, supported himself by teaching mathematics. In 1697, he published an examination of Dr. Woodward's account of the Deluge, which brought him into notice. Accident called him into attendance on Prince George of Denmark, who thenceforth patronized him. In 1709, he was appointed physician to the queen, and in 1710 was elected a member of the Royal College of Physicians. On the death of Queen Anne, 1714, he lost his situation. In 1717, A., with Pope, gave assistance to Gay in a farce entitled *Three Hours after Marriage*, which, though having the aid of a trio of wits, was a failure. In 1723, he was chosen second censor of the Royal College of Physicians; in 1727, he was made an Elect, and had the honor to pronounce the Harveian oration for the year. A. was one of the leaders in that circle of wits which adorned the reign of Queen Anne, and was still more nobly distinguished by the rectitude of his morals and the goodness of his heart. He assisted Swift and Pope in the composition of that brilliant satire, the *Memoirs of Martinus Scriblerus*, contributing those portions of it which refer to science and philosophy; and he was undoubtedly the author of the celebrated political *jeu d'esprit*, the *History of John Bull*, which has so often been imitated. Besides several medical essays, he published *Tables of Greek, Roman, and Jewish Measures, Weights, and Coins* (Lond. 1705-08), a work which was long the best authority on the subject. There is also a philosophical poem of his composition in Dodsley's *Miscellanies*, entitled *Know Thyself*.

**ARBUTUS**, *ár'bŭ-tŭs*: genus of plants of the natural order *Ericææ*, containing a number of species, small trees and shrubs, the greater part of which are American. The fruit is fleshy, 5-celled, many-seeded, usually dotted with little projections, whence that of some species has a sort of resemblance to strawberries; the corolla is urn-shaped.—*A. Uredo*, the STRAWBERRY TREE, is a native of the s. of Europe, found also in Asia and America, and in one locality in the British Isles, the Lakes of Killarney, where its fine foliage adds much to the charm of the scenery. It requires protection in winter in the climate of Paris. In Britain, it is often planted as an ornamental evergreen. It grows to a height of 20-30 ft., but is rather a great bush than a tree. The bark is rugged; the leaves oblongo-lanceolate, smooth and shining, bluntly serrated; the flowers nodding, large, greenish white; the fruit globose, of a scarlet color, with a vapid sweetish taste. It is, however, sometimes eaten. Of late, excellent alcohol has been made from it in Italy. A wine is made from it in Corsica, which, however, is narcotic, if taken in considerable quantity, as the fruit itself is, if eaten too freely. The bark and leaves are astringent.—*A. Andrachne* is also sometimes cultivated as an ornamental plant in Britain, but is im-

## ARBUTUS—ARC.

patient of severe frosts. Its fruit, and that of *A. integrifolia*, are eaten in Greece and the East. But all the species seem to possess narcotic qualities in greater or less degree; the fruit of *A. furens*, a small shrub, a native of Chili, so much as to cause delirium.—*A. aculeata*, which abounds at Cape



Arbutus Unedo, showing branch, flowers, and fruit.

Horn and on Staten Island (lying s.e. of Terra del Fuego), is an elegant and most pleasing evergreen, much resembling the myrtle. It grows to the height of 3 or 4 ft., and produces small white flowers, followed by a profusion of red shining berries, which ornament the bush during winter. Their flavor is insipid, but somewhat astringent. Mixed with a few raisins, they have been made by voyagers into tolerable tarts.—*A. Uva ursi*, now generally called *Arctostaphylos Uva ursi*, the RED BEARBERRY, is a small trailing evergreen shrub, common in the Highlands of Scotland and in the Hebrides, and indeed in the northern parts of Europe, Siberia, and North America. It grows in dry, heathy, and rocky places. The flowers are in small crowded terminal racemes, of a beautiful rose color. The berries are austere and mealy; they are said to form a principal part of the food of bears in northern regions. Grouse also feed on them. The dried leaves are used as an astringent and tonic medicine, and as such have a place in the pharmacopœias, being employed principally in chronic affections of the bladder; but those of *Vaccinium vitis Idæa* are often fraudulently substituted for them.—The BLACK BEARBERRY (*A.* or *Arctostaphylos alpina*) is also a native of the northern parts of the globe, a small trailing shrub, with black berries about the size of a sloe, relished by some, but having a peculiar taste disagreeable to others. The plant is found in the Alpine localities of N. Hampshire and Maine.

ARBUTUS, TRAILING or MAYFLOWER: see EPIGÆA REPENS.

ARC, n. *árk* [*L. arcus*, a bow]: a part of a circle or



## ARC—ARCADIA.

curved line. **ARCADE**, n. *âr-kād'* [F.—from L. *arcus*]: a series of arches; a roadway under a continued series of arches; a covered street. **ARCADED**, a. furnished with an arcade. **ARC OF A CIRCLE**, a part of the circumference of a circle cut off by two lines radiating from its centre: see **ARCH** 1.

**ARC**: any part of a curved line. A straight line joining the ends of an A. is its *chord*, which is always less than the A. itself. Arcs of circles are *similar* when they subtend equal angles at the centres of their respective circles; and if similar arcs belong to equal circles, the arcs themselves are *equal*. The length of an A. is readily found if the angle which it subtends at the centre of the circle is known, and also the length of the whole circumference. Let the whole circumference be 100, and the angle of an A.  $50^\circ$ , the length

100×50  
of the A. is  $360^\circ : 50^\circ :: 100 : \frac{\quad}{360} = 14$  nearly.

**ARC**: see **JOAN OF ARC**.

**ARCA**, *âr'kă*, or **ARK-SHELL** [L. *arca*, a chest or box]: a genus of equivalve shells, and lamello-branchiate Mollusca, the type of a family called *Arcadæ*, or *Arcaceæ*; found in almost every part of the world. In the true ark-shells, the hinge is straight.

**ARCACHON**, *ar-kâ-shōng'*: a bathing-place which has sprung up recently on the s. side of the Bassin d'Arcachon, 35 m. s.w. of Bordeaux, France. Pop. about 8,000. The fine broad sands are admirably adapted for bathing; and the place is sheltered by sand-hills, covered with extensive fir woods. Its numerous villas among the firs are much frequented in winter by invalids afflicted with lung disease. Scientific oyster culture is practiced here on a large scale. There are 3,300 oyster 'parks' in the lagoon of A., lined with 6,000 ova tiles for the collection of oyster spat, and calculated to yield two hundred millions of infant oysters in a single season. See **OYSTER**.

**ARCADE**: a row of arches, supported by columns, either having an open space of greater or less width behind them, or in contact with masonry. The A. in Gothic corresponds to the colonnade in classical architecture. The term A. is sometimes applied to the row of piers, or columns and arches, by which the aisles are divided from the nave of a church, or by which cloisters, sometimes erroneously called piazzas, are enclosed; but it is generally confined to those series of smaller arches which are employed for purposes of ornamentation. Arcades of the latter kind are often found surrounding the square towers of English churches. The term is also applied, improperly, to a glass-covered street or lane, with a row of shops or stalls on each side.

**ARCADIA**, *âr-kă'ăi-a*: the middle and highest part of the Peloponnesus: was bounded on the n. by Achaia, on the e. by Argolis, on the s. by Messenia and Laconia, and on the w. by Elis. According to Pausanias, it derived its name from Arcas, the son of Callisto. Next to Laconia, A.

## ARCADIAN—ARCADIUS.

was the largest country in the Peloponnesus. It had an area of 1,700 sq. m., and was girt round by a circle of mountains, which cut off to a large extent its communication with the rest of the peninsula. Mountains also intersected it in different directions. The western part of what was anciently A. is wild, bleak, and rugged, and was at one time covered with huge forests; the eastern is more fertile, the mountains not so high, and the vales more luxuriant. In these eastern valleys lay all the principal cities of A. The loftiest peak in A.—the loftiest also in the Peloponnesus—is Mount Cyllene, in the n.e. (7,787 ft.). The chief river was anciently the Alpheius (q.v.). Originally A. was named Pelasgia, after its first inhabitants, the Pelasgi. Subsequently, it was divided into several small states which formed a confederation. Of these states, the chief were Mantinea, Tegea, Orchomenos, Pheneus, Psophis, and Megalopolis. The inhabitants, engaged chiefly in tending cattle and in hunting among the wild highlands, remained long in a state of barbarism. After civilization had advanced, and the Arcadians had become known by their love of music and dancing, they still retained some military spirit, and were sometimes engaged as mercenary soldiers. But generally their character accorded with their simple, rural mode of life; though it seems certain that human sacrifices were offered as late as the period of the Macedonian sway. The Arcadians were not remarkable for their intelligence. In fact, an 'Arcadian youth' was a synonym for a blockhead. Pan and Diana were their favorite deities. Ancient and modern poets (the latter especially in the time when 'pastorals' were popular) have described A. as the land of peace, innocence, and patriarchal simplicity of manners.

ARCADIAN, *a. ár-kā'dĩ-ăn*, pertaining to Arcadia, in the Peloponnesus; much used in poetry in the sense 'rural' or 'pastoral.'

ARCADIUS, *ár-kā'dĩ-ŭs*: first Emperor of the East; 383-408 (reigned 395-408); b. Spain; son of the emperor Theodosius, after whose death the Roman empire was divided into East and West. A. lived in oriental state and splendor, and his dominion extended from the Adriatic Sea to the river Tigris, and from Scythia to Ethiopia; but the real rulers over this vast empire were, first, the Gaul Rufinus, and afterwards the eunuch Eutropius, who openly assumed the reins of government and the command of the army, while A. reposed in luxurious indifference. In 399, the eunuch Eutropius was deposed by another usurper, Gainas, who, in his turn, soon fell a victim to his own ambition. Afterwards, Eudoxia, the wife of the emperor, assumed the supremacy. One really great man adorned this period, the virtuous and eloquent Chrysostom, who was persecuted by Eudoxia, and through her influence exiled in 404, on account of his firm opposition to Arianism, which the empress herself favored. During the reign of A., his territories suffered by barbarian incursions, earthquakes, and famine, but nothing could disturb the indifference of the monarch. He died unlamented.



## ARCANI DISCIPLINA—ARCESILAUS.

ARCANI DISCIPLINA (instruction in secret things) see MYSTAGOGUE, SECRET, DISCIPLINE OF THE.

ARCANUM, n. *âr-kă'nŭm*, plu. ARCA'NA [L. *arcānus*, secret, concealed]: thing secret, as if locked up. ARCANITE, n. *âr'kă-nŭt*, a mineral, a colorless or white sulphate of potash, occurring mostly in crusts in lavas.

ARCE, *ar'chā* (anc. *Arx*): t. of s. Italy, province of Caserta; 60 m. e.s.e. from Rome. It is situated on a hill near the Liris; and the summit, lofty and precipitous, is crowned by an interesting mediæval fortress called *Rocca d'Arce*. This fortress was considered impregnable till it was scaled and taken by the invading army of Charles of Anjou in 1266. Numerous inscriptions in which the name of Cicero occurs have been discovered near A.; and some ruins near the town are known as *L'aja di Cicerone*, or Cicero's Barn. Pop. about 2,000.

ARCESILAUS, *âr-sēs'ŭ-lā'ŭs*: B.C. 316—abt. 241; b. Pitane, in Æolia, Asia Minor: a Greek philosopher, founder of the New Academy. He studied philosophy, first under Theophrastus the Peripatetic, afterwards under Crantor. After the death of Crantor, A. became the chief master of the Academic party, or those who held to the doctrines of Plato; but he introduced so many modifications that its philosophic character was completely changed. His great rivals were the Stoics, whose opinions he attacked, but he does not appear to have attained any certainty in his own convictions. He had studied under too many masters, and discussed too many different systems, to be sure of the truth of any. He denied the Stoical doctrine of a 'convincing conception,' which he affirmed to be, from its very nature, unintelligible and contradictory. He also denied the existence of any sufficient criterion of truth, and recommended abstinence from all dogmatic judgments. In practice he maintained that we must act on grounds of probability. It is not easy to determine satisfactorily what his moral character was. A wit, a poet, and a man of frank and generous disposition, which seems to have captivated his disciples even more than his philosophy, he has yet been accused by his enemies of the grossest profligacy; and whatever extravagance there may be in such an extreme charge, it is nearly certain that he died of a debauch in his 76th year. Nevertheless, his adversary Cleanthes, the Stoic, passed this high eulogium on him: 'The morality which A. abolishes in his words, he re-establishes in his actions.'

## ARCH.

**ARCH**, n. *ârch* [F. *arche*, an arch—from mid. L. *archiā*, the arch of a bridge: L. *arcus*, a bow, a curved line—lit., the circular part of any building]: the hollow or concave part of a bridge or gateway: V. to cover with an arch; to form an arch. **ARCH'ING**, imp. **ARCHED**, pp. *ârcht*. **COURT OF ARCHES**, n. *ârch'êz*, a very anc. court belonging to the Archbishop of Canterbury for deciding ecclesiastical matters, so called from the Church of St. Mary *le Bow*, or '*de ar'cubus*.' **ARCH'WAY**, a way or passage under an arch. **TRIUMPHAL ARCH**, a magnificent arched structure to commemorate the triumphant return of a conqueror, or to perpetuate some remarkable event.

**ARCH**, a. *ârch* [Ger. *arg*, morally bad: Dut. *erg*, wicked: Dan. *arrig*, ill-natured: Icel. *argr*, lazy, cowardly: AS. *earg*, bad]: bad and worthless; waggish; mirthful. **ARCH'LY**, ad. *-lî*, shrewdly; roguishly. **ARCH'NESS**, n. humor with a touch of wicked pleasure; sly humor; waggishness.

**ARCH**, a. *ârch* or *âr*k [Gr. *archos*, chief; *archein*, to be first: It. *arci*: Ger. *erz*, eminence, good or bad]: chief or principal; chief, or of the first class. **ARCHANGEL**, see below. **ARCHBISHOP**, n. *ârch-bîsh'ôp*, a chief bishop; a metropolitan having jurisdiction over the bishops of his province. **ARCHBISH'OPRIC**, n. *-rîk*, the office, dignity, or see of an archbishop. **ARCHI-EPISCOPAL**, a. *âr'kî-ê-pîs'kô-pâl*, pertaining to. **ARCHDEACON**, n. *ârch-dê'kôn*, one who assists the bishop in the government of his diocese. **ARCHDEA'CONSHIP**, n. the office of an archdeacon. **ARCHDEACONRY**, n. *ârch-dê'kôn-rî*, the living. **ARCHIDIACONAL**, a. *âr'kî-dî-âk'ô-nâl*, pertaining to an archdeacon. **ARCH-EN'EMY**, n. a chief enemy; the evil one; the devil. **ARCHDUKE**, n. *ârch-dûk'*, a title of some foreign princes. **ARCHDUCHESS**, n. *-dûch-ês*, his wife, sister, or daughter. **ARCHDUCAL**, a. *-dû'kâl*, of or belonging to an archduke. **ARCH'MOCK**, n. *-môk* [see **ARCH** 3, and Eng. *mock*]: in *OE.*, pre-eminent mockery. *Note.*—**ARCH**, followed by a consonant, is pronounced *ârch*, and by a vowel, *âr*k.

**ARCH**: an arrangement of bricks, stones, or other materials over an open space, by which they are made not only to support each other by mutual pressure, but to sustain a superincumbent weight. We have the excellent authority of Sir G. Wilkinson for stating that the A. was known to, and used by, the ancient Egyptians; and that the Assyrians were acquainted with its principles is placed beyond doubt by the arched gateways so frequently represented in their bass-reliefs. The A. is generally supposed to have been unknown to the Greeks—a supposition which becomes very improbable, if we hold it to be proved that it was used by nations with whose works they must have been familiar. But that the Greeks did not employ it generally in their architectural structures, is certain; and as it is not less certain that the Romans did, it is to the latter people that the nations of modern Europe are indebted for their acquaintance with its great utility. The introduction of the A. by the Romans gradually effected a complete revolution in the architectural forms which they borrowed from the Greeks.

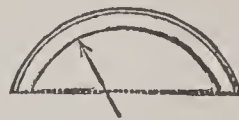


The predominance of horizontal lines gave way by degrees, till, as the Romanesque passed into the Gothic style, it was superseded by the segments of a circle, placed generally more or less in a perpendicular direction. In its earliest application by the Romans, the A. did not spring from the entablature of the columns, but was generally placed behind them, and rested upon separate imposts. Subsequently, this arrangement was departed from, and the A. assumed the position which it has since retained above the columns; sometimes having an entablature interposed, and sometimes rising directly from the capital of the column or pier, as in the Romanesque. Before mentioning very briefly the different forms of the A., it seems natural to refer to a very simple structure, frequently met with in those early edifices in Britain which we are in the habit of designating as Saxon. It consists of two stones, their lower ends resting on rude piers, their tops leaning against each other, and thus forming two sides of a triangle, which is capable of supporting a moderate superincumbent weight. The mechanical principles on which the A. depends, though here very imperfectly employed, seem sufficiently called into play to suggest their more extensive application; and it is not impossible that out of this rude construction the A., in its later and more elaborate forms, might have developed itself without hints from foreign sources.

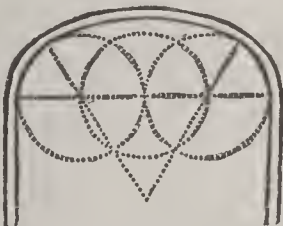
Of the A. itself, the following variations of form may be enumerated: The semicircle (1), the segment (2), the ellipse (3), which were the only forms employed by the ancients, and which alone were known in mediæval architecture before



1. Semicircle.



2. Segment.



3. Ellipse.



4. Stilted A.

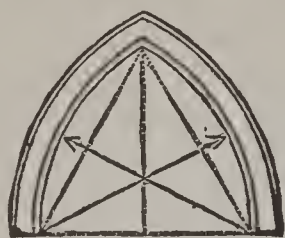


5. Horseshoe A.

the time at which the pointed A. was introduced. Of these, the stilted A. (4), and the horseshoe A. (5), are modifications, in both of which the centre or point from which the A. is described is above the line of the impost, but in the former of which the moldings are continued downwards vertically; while in the latter they are slightly inclined inwards, or the curve is prolonged till it meets the impost. The horseshoe A. belongs peculiarly to Arabian architecture (q.v.), not only from its having originated simultaneously with the faith of the Prophet, but from its continuing to be used exclusively by his followers. Next, in point of time, though far surpass-

# ARCH.

ing all the others in beauty and variety, is the pointed A., the origin of which is still a subject of antiquarian controversy. The greater or less acuteness of the pointed A. de-



6. Equilateral A.



7. Lancet A.



8. Drop A.



9. Segmental A.

pend on the position of the two centre points from which its curved sides are described. Its various proportions will



10, 11, 12, Trefoil Arches.

be better understood from the accompanying diagrams (6, 7, 8, 9) than from any verbal description.

Of the foil arches (10, 11, 12, 13, 14), or arches in which



13. Cinquefoil A.

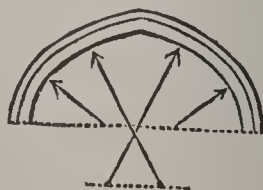


14. Polyfoil A.

the forms of a leaf are imitated, the first three are examples of the trefoil, the fourth of the cinquefoil, and the fifth of



15. Ogee A.



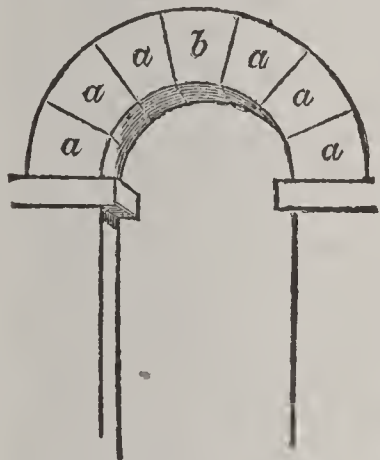
16. Tudor A.

the polyfoil, the latter being found in Arabian and Roman-



## ARCH—ARCHÆAN PERIOD.

esque buildings. At a later period of Gothic architecture, with the decorated style, the ogee A. (15) was introduced, and the Tudor or four-cornered A. (16) appeared about the commencement of the perpendicular style. When first introduced, the proportions of this A. were bold and effective; but it was gradually depressed till the principle of the A. was lost, and its very form was again merged first in two and then in one flat stone or lintel over an opening. With the last form of the Tudor A. we thus reach almost the point of departure in the construction of the A., and complete our enumeration of its forms.



The sides of an A. are termed *haunches* or *flanks*, and its highest part is called the *crown*. The wedge-shaped stones, bricks, or other materials of which an A. is constructed are called *voussoirs* (*a, a, a*); the uppermost one of all (*b*) is called the *keystone*; the lowest, which is placed immediately over the impost, the *springer*, or springing-stone; the under or lower side of the voussoirs, the *intrados*; the upper side, the *extrados* or *back*.

For the investigation of the mechanical principle of the arch, and of the conditions of stability, see Moseley's *Mechanical Principles of Engineering and Architecture*. See BRIDGE: IMPOST: PIER: BUTTRESS.

**ARCH, TRIUMPHAL:** a structure erected by the Romans across roads, or at the entrance of cities, in honor of victorious generals. The original triumphal A. was the Porta



Triumphal Arch of Constantine at Rome.

Triumphalis, one of the gates of Rome through which the triumphal procession entered the city. Among the earliest detached arches built at Rome was that built by Scipio Africanus (B.C. 190) on the Capitoline Hill. Under the emperors, these structures became numerous and magnificent, and were decorated with bass-reliefs and inscriptions. Three of what were properly triumphal arches still re-

main in Rome, those, namely, of Titus, Septimius Severus, and Constantine. Numerous similar monuments exist in other parts of the old Roman empire, as at Rimini, Susa, Verona, Ancona, Orange (in France), Capura (in Spain).

**ARCHÆAN PERIOD,** in Geology: otherwise known

## ARCHÆOCIDARIS--ARCHÆOLOGY.

as the Eozoic Era: the first system of rocks known to geologists. Although the Archæan rocks are the oldest known, they are not *primitive*; but, being stratified, are thus known to be sedimentary, the consolidated débris of still older rocks of which geologists know nothing. It is considered probable that these rocks were originally sands, clays, and limestones, later metamorphic: the sands being changed into quartzites, the clays into schists, gneiss, and even granites, and the limestones into marbles. It is noteworthy, however, that with these are associated two kinds of beds: iron ore and graphite. In Canada, the whole series of Archæan rocks is said to be as much as 40,000 ft. thick. It is a fact that the greatest beds of iron ore known in any strata are found in this system: thus the great iron-ore beds of Sweden, of Lake Superior, of New Jersey, and of the Iron Mountain of Missouri are in these rocks, as well as those immense ones recently discovered in s. Utah. The area covered by these rocks extends round the world, cropping out in some places as surface rocks, but mostly covered by the later formations. In N. Amer., it occupies in the n. a V-shaped space, and covers nearly the whole of Labrador, nearly all of Canada, enters New York at the Adirondacks, and extends n.w. into the Arctic regions. Another area includes the Blue Ridge and the e. slope of the Appalachian range extending from New England to Georgia. Involved in this system are the axes of certain of the other great mountain ranges, as the Colorado, Park, and Wahsatch, and possibly the Sierra Nevada. There are also some isolated instances, including one in Texas and one in Missouri. In Europe these rocks are found in the n.w. of Scotland; in Norway, Sweden, and Russia; in Bohemia and Bavaria, and among the Alps and the Carpathians. From the fact that these rocks are stratified, it is known that they were all at one time covered with water. There is reason to believe that they contained the lowest forms of vegetable and animal life, though this has never been demonstrated. The enormous thickness of the Archæan rocks, they being probably equal to all later rocks together, represents an amount of time perhaps equal to all the rest of the recorded geological history of the earth. See EOZOON.

**ARCHÆOCIDARIS**, n. *âr'kê-ô-sîd'âr-îs* [Gr. *archai'os*, ancient: Gr. *kid'aris*: L. *cid'aris*, a turban]: the sea-egg; a genus of fossil sea-urchins characterized by their small hexagonal plates and long spines.

**ARCHÆOLOGY**, n. *âr'kê-ôl'ô-jî*, or **ARCHAIOLOGY**, n. *âr'kê-ôl-ô-jî* [Gr. *archai'os*, ancient; *logos*, discourse]: the science that treats of ancient things or antiquities; knowledge about ancient art, particularly of the middle ages. **ARCHÆOL'OGIST**, n. one skilled in ancient things and learning. **ARCHÆOLOGICAL**, a. *âr'kê-ô-lôj'î-kâl*, pertaining to. **ARCHÆOLOG'ICALLY**, ad. -lî.

**ARCHÆOL'OGY**: name now generally given to the study formerly known as that of 'antiquities.' The term is well understood, although its meaning is not definitely fixed. In its widest sense, it includes the knowledge of the



## ARCHÆOLOGY.

origin, language, religion, laws, institutions, literature, science, arts, manners, customs—everything, in a word, that can be learned of the ancient life and being of a people. When so used, it comprehends more or less of several branches of knowledge recognized as distinct or independent pursuits, such, for example, as ethnology, philology, history, chronology, biography, mythology, numismatics. In its narrower but perhaps more popular signification, A. is understood to mean the discovery, preservation, collection, arrangement, authentication, publication, description, interpretation, or elucidation of the materials from which a knowledge of the ancient condition of a country is to be attained. These materials will be found to divide themselves into three great classes: (1) written, (2) monumental, and (3) traditional. 1. What may be called written A., may be again subdivided into palæography (q.v.), or diplomatics (q.v.)—that is, the science of ancient writings; and bibliography (q.v.) or the knowledge of printed books. 2. Monumental A. admits of almost endless subdivisions, according to the character of the remains to be studied, which may be works of art, such as buildings, sculptures, paintings, engravings, inscriptions, coins, medals, seals, armorial bearings, tapestry, furniture, plate, jewels, enamels, glass, porcelain, pottery; works of engineering, such as roads, canals, mines, piers, camps, forts, walls; works of unskilled labor, such as pillars of unhewn stone, caves, dikes, ditches, mounds of earth or stone; articles of dress, armor, or personal ornament; tools, weapons, implements, utensils, machines; appliances for locomotion, such as canoes, boats, ships, carriages; modes of sepulture, such as mummies, sarcophagi, urns, catacombs, graves; vestiges of man and animals, such as skulls, bones, skins. 3. Traditional A. includes as well the unwritten language and oral literature of a people, their dialects, legends, tales, proverbs, rhymes, songs, and ballads, as those sports, customs, ceremonies, rites, and superstitions now beginning to be known by the name of ‘folk-lore,’ and formerly called ‘popular antiquities.’

The study of A. in modern Europe may be held to date from the revival of letters. It was long almost exclusively confined to the antiquities of the Greeks and Romans. About the middle of the 16th c. Mediæval A., or the antiquities of the dark and middle ages, began to be cultivated. Egyptian A., or ‘Egyptology,’ as it is sometimes called, made comparatively little progress until the discovery of the Rosetta Stone, containing a bilingual and trilateral inscription, which enabled Young in 1819, and Champollion in 1821, to find a key to the hieroglyphics. The more recent discoveries of Botta, Layard, Rawlinson, and others, have already advanced Assyrian A. to a point beyond all expectation. Indian A. has been successfully prosecuted, especially during the last forty years, chiefly by officers of the East India company. Something also has been done by them and others for Chinese A. In the United States much study has been given to the mysterious remains of the aboriginal inhabitants of N. America. The A. of Central and S.

## ARCHÆOPTERYX—ARCHANGEL.

Amer., as it attracted attention much earlier, so its more stately and instructive monuments have much better rewarded such investigations as those of Lord Kingsborough, Messrs. Stephens and Catherwood, and others.

The study of A. has been largely promoted by the publication, at the expense of the state, in various countries, of the national chronicles, charters, and records; by societies and clubs contributing to the same end, or printing essays on questions of A.: and by the establishment by the state, by associations, or by individuals, of museums for the collection and classification of antiquities. In England, a society for promoting the study of antiquity was founded in 1572. The irrational jealousy of the government dissolved it in 1604. It was revived in 1707, enlarged in 1717, and incorporated by royal charter in 1751, under the name of the 'Society of Antiquaries of London.' An attempt to institute a similar society in Scotland was made about 1700 by 'some honorable and knowing gentlemen.' But it was not until 1780 that the Society of Antiquaries of Scotland was incorporated by royal charter. The Royal Irish Academy for promoting 'the study of science, polite literature, and antiquities,' was chartered in 1786. The Society of Antiquaries of Scotland and the Royal Irish Academy have good museums of national antiquities. The British Museum in London (established 1753), besides a great collection of early manuscripts and printed books, has galleries of Assyrian, Egyptian, Etruscan, Greek, Roman, British, and Mediæval antiquities. One of the most remarkable collections of antiquities on the continent is that of the Royal Society of Antiquaries of the North, at Copenhagen, arranged so as to illustrate a favorite theory of the Scandinavian archæologists—that the primitive antiquities of a country may be assigned to three successive ages or periods of stone, bronze, and iron, with as much certainty and precision as the comparative antiquity of geological strata, or periods of the world's creation, may be determined by the fossils which they are found to contain. The museums of the Louvre and the Hôtel de Cluny, in Paris, contain fine collections of Assyrian, Egyptian, Greek, and Roman antiquities, and an unrivalled collection of Mediæval antiquities. The Royal Museum at Naples has gathered together the statues, paintings, vases, household utensils, and other objects recovered during the last hundred years from the ruins of Herculaneum and Pompeii.

ARCHÆOPTERYX, n. *âr'kê-ôp'tér-îks* [Gr. *archai'os*, *ptērux*, a wing]: a unique specimen of fossil bird remains—now in the British Museum, constituting the ord. *Sau'ruræ*, having remarkable reptilian affinities. See SOLENHOFEN. A later, more perfect specimen is in the Yale collections.

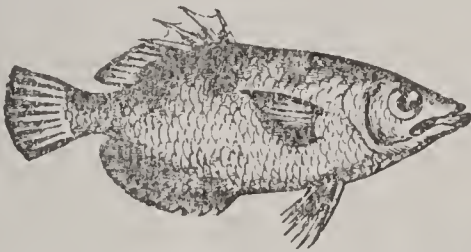
ARCHAISM, n. *âr'kâ-îzm* [Gr. *archai'os*, ancient—from *archê*, beginning]: an ancient expression, or one not now used. ARCHAIC, a. *âr-kâ'îk*, or ARCHAI'ICAL, a. *-î-kâl*, ancient; peculiar to remote antiquity; obsolete.

ARCHANGEL, n. *âr-k-ân'jêl* [Gr. *archang'gelos*, an archangel—from *archos*, a chief; *ang'gêlos*, a messenger]: an

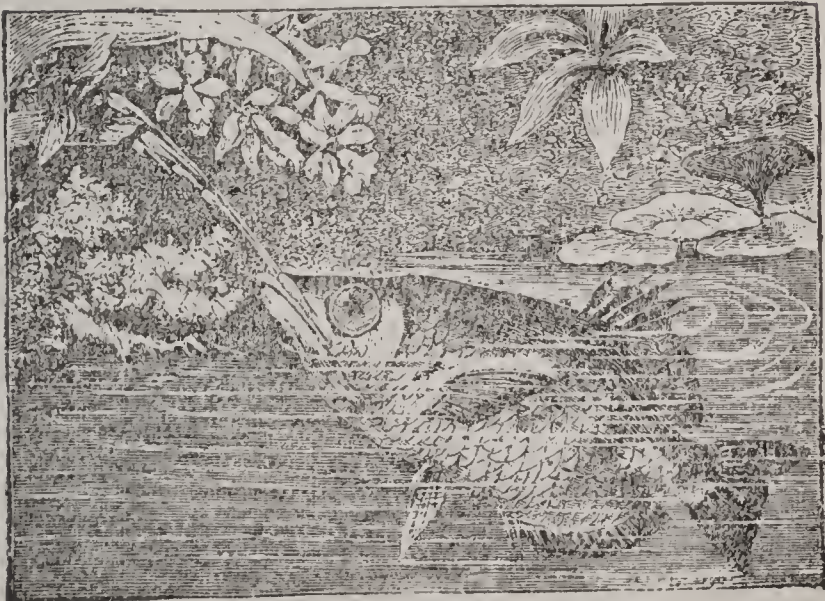




Remains of Archæopteryx in Solenhofen Stone



Archer-fish (*Toxotes jaculator*).



Archer-fish (*Toxotes jaculator*). Another specimen.

## ARCHANGEL—ARCHBISHOP.

angel of the highest order. ARCH'ANGEL'IC, a. *jəl'ik*, pertaining to. *Note.*—Most of the other words beginning with *arch* are to be looked for under the simple words; ARCH always meaning *chief, of the first class*—as ARCHBISHOP, the chief bishop.

ARCHANGEL, *árk-ān'jəl*: the chief city in the Russian dept. of Archangel; in lat. 64° 32' n., and long. 40° 33' e., about 40 m. above the junction of the river Dwina with the White Sea; the seat of an archbishop. Its name is taken from the monastery of St. Michael. A. is the chief commercial city for the n. of Russia and Siberia, and is visited by numerous vessels—especially British—from July to September, the port being clear of ice only during that period. The houses are built chiefly of wood, and their general appearance is far from handsome. The finest edifices are the bazaar or mart, and the marine hospital. A. has an ecclesiastical college with nine professors, schools for engineering and navigation, etc. The chief articles of traffic are fish, train-oil, skins, furs, timber, wax, iron, tallow, bristles, caviare. The town, which is the oldest seaport of the empire, and was for a long period the only one, was founded in 1584. During summer, A. has a continual market. Pop. (1893) 19,936.

The government of A. has an area of 331,505 sq. m.; pop. (1893) 354,411.

ARCHAN'GEL: a term which occurs in the New Test.; and which, according to some, is there a title of our Saviour—but is usually considered to designate an angel superior in power and glory to the other angels. We read in the Epistle of Jude of 'Michael the A.,' and in Rev. xii. 7, of 'Michael and his angels.' In 1 Thess. iv. 16, we are told that the coming of our Lord at the last day shall be 'with the voice of the A., and with the trump of God.' We nowhere read in the Holy Scriptures of *archangels*, although the plural is popularly as much used as the singular. The notion of an angelic hierarchy certainly prevailed among the Jews, the highest place being assigned to Michael; and the same notion has extensively prevailed in the Christian Church. There are passages of Scripture which seem to indicate different degrees and classes among the angelic hosts, but no clear revelation has been made upon this subject. See ANGELS.

ARCHANGEL, NEW: see SITKA.

ARCHBISHOP, *árch-b'ish'öp* [Gr. *arch*, and *episcopos*, overseer]: the title given to a metropolitan bishop who superintends the conduct of the suffragan bishops in his province, and also exercises episcopal authority in his own diocese. The title arose in the 3d and 4th centuries, from the provincial synods being held once or twice a year in the chief town of the province under the presidency of the bishop of the place. Another cause of the origin of the title is said to be the custom of planting new bishoprics as Christianity spread, a slight supremacy being still retained by the original over the newly appointed chief pastors. In the Oriental Church, the archbishops are still called 'metropolitans,'



## ARCHBISHOP.

from the circumstance first mentioned. In the African Church, on the other hand, the term used was 'primus.' The great archbishoprics of the early church were those of Jerusalem, Antioch, Ephesus, Alexandria, Constantinople, and Rome. Since the 6th c., the A. of Rome has assumed the name of pope (papa). There is an official letter by Justinian, addressed to 'John, A. of Rome and Patriarch'; and several ecclesiastical constitutions are addressed to 'Epiphanius, A. of Constantinople and Patriarch.' The synod of Antioch, 341, assigned to the A. the superintendence over all the bishoprics, and a precedence in rank over all the bishops of the church, who, on important matters, were bound to consult him and be guided by his advice. By degrees there arose out of this superiority of rank privileges which at length assumed the character of positive jurisdiction in ecclesiastical matters. Many of these rights passed to the patriarchs (q.v.) towards the end of the 4th and during the 5th centuries, and still more to the pope in the 9th. The archbishops still retained jurisdiction, in the first instance, over their suffragans in matters which were not criminal, and over those who were subject to them they acted as a court of appeal. They possessed also the right of calling together, and presiding in, the provincial synods; the superintendence and power of visitation over the bishops of the metropolitan see; the power of enforcing the laws of the church; the dispensation of indulgences, and the like. The archbishops further enjoyed the honor of having the cross carried before them in their own archiepiscopate, even in presence of the pope himself, and of wearing the *pallium*. In England, there are two archbishops of the Church of England, of whom one has his seat at Canterbury, the capital of the ancient kingdom of Kent; the other at York, the capital of Northumbria. But though, as ruling over a province in place of a single diocese, both have held the rank of metropolitans from the first, the A. of Canterbury has all along had precedence, not merely as the successor of Augustine and the senior A., but as possessing a pre-eminent and universal authority over the whole kingdom. This pre-eminence is marked in the titles which they respectively assume—the A. of Canterbury being styled the primate of all England (*metropolitanus et primas totius Angliæ*), while the A. of York is simply called primate of England (*primas et metropolitanus Angliæ*). It is also indicated by the places which they occupy in processions—the A. of Canterbury, who has precedence of all the nobility, not only preceding the A. of York, but the lord chancellor being interposed between them. Previous to the creation of an archbishopric in Ireland the authority of the A. of Canterbury extended to that island. The amount of control which belongs to an A. over the bishops of his province is not very accurately defined; but if any bishop introduces irregularities into his diocese, or is guilty of immorality, the A. may call him to account, and even deprive him. In 1822, the A. of Armagh, who is primate of all Ireland, deposed the Bishop of Clogher on the latter ground. To the A. of Canterbury belongs the honor of placing the crown on the sovereign's

## ARCHDEACON.

head at his coronation; and the A. of York claims the like privilege in the case of the queen-consort, whose perpetual chaplain he is. The province of the A. of York, consisting of the six northern counties and Cheshire, includes 9 dioceses. The rest of England, with Wales, forms the province of the A. of Canterbury, and includes 24 dioceses. The dioceses of the two archbishops—i.e., the districts in which they exercise ordinary episcopal functions—were remodelled by 6 and 7 Will. IV. c. 77. The diocese of Canterbury comprises Kent, except the city and deanery of Rochester, and some parishes transferred by this act; a number of parishes in Sussex called ‘peculiars;’ with small districts in other dioceses, particularly London. The diocese of the A. of York embraces the county of York, except that portion of it now included in the dioceses of Ripon and Manchester, and some other detached districts.

In Ireland, there are two Protestant and four Roman Catholic archbishops. Of the former, the A. of Armagh is primate of all Ireland; the A. of Dublin being primate of Ireland. They formerly sat alternately in the house of lords; the three bishops who, with them, represented the Church of Ireland being chosen by rotation. The election of an A. does not differ from that of a bishop (see BISHOP); but when he is invested with his office, he is said to be ‘enthroned,’ whereas a bishop is ‘consecrated.’ He also writes himself ‘by Divine Providence;’ a bishop being ‘by Divine permission;’ and has the title of ‘Grace,’ and ‘Most Reverend Father in God,’ while a bishop is styled ‘Lord,’ and ‘Right Reverend Father in God.’ The A. is entitled to present to all ecclesiastical livings in the disposal of diocesan bishops, if not filled up within six months; and every bishop, whether created or translated, was formerly bound to make a legal conveyance to the A. of the next avoidance of one such dignity or benefice belonging to his see as the A. shall choose.

In the Prot. Epis. Church in the United States, there are no archbishops. There are in the United States 14 archbishops of the Rom. Cath. Church.

ARCHDEACON, *arch-dē'kōn* [Gr. *arch*, and *diaconos*, servant]: an ecclesiastical dignitary whose jurisdiction is immediately subordinate to that of the bishop. The A. originally was simply the chief of the deacons, who were the attendants and assistants of the bishop in church affairs. His duties consisted in attending the bishop at the altar and at ordinations, assisting him in managing the revenues of the church, and directing the deacons in their duties. From being thus mere assistants, archdeacons in the 5th c. began to share the bishop's powers, and step by step attained to the authority which they now enjoy, which from the 9th c. became in many respects distinct from that of the bishop. Several synods protested against the innovation, but it was continued in the 11th and 12th centuries, when the archdeacons were recognized as the most influential of prelates. In the 13th c., their powers were limited by the establishment of episcopal courts. Their dignity and influence is now very much reduced in the Rom. Cath. Church. There were formerly 60 archdeaconries in England, but their



## ARCHDUKE—ARCHEGOSAURUS.

number has been considerably increased since the passing of the act for carrying into effect the report of the Ecclesiastical Commissioners (6 and 7 Will. IV. c. 77); and it is probable that under the provisions of that act they may be still further increased. No person can be appointed an A. till he has been six years complete in priest's orders (3 and 4 Vict. c. 113, s. 27). The duty of parochial visitation has long been regarded as belonging specially to the archidiaconal office, and it was by its exercise mainly that the archdeacons attained to the dignity of ordinary instead of delegated jurisdiction. Even in performing this function, however, and in holding general synods or visitations, ordering repairs of churches, and the like, the A. is properly to be regarded as being what the canon law called him, 'the bishop's eye.' The judge of the A.'s court, when he does not preside, is called 'the official.' There is an appeal to the Court of the Bishop, or in the case of an A. of an archbishopric, to the Court of Arches. See DEACON: DEAN: PRIEST. See also Cripp's *Law Relating to the Church and Clergy*.

ARCHDUKE': a title now taken by all the sons (Archduchess by all the daughters) of the emperor of Austria, and by their descendants through the male line. The title of A. was gradually assumed by the dukes of Austria, as a mark of precedence over the other dukes of the empire. Duke Rudolph IV. of Austria, in 1359, called himself Palatinus Archidux, but he was not so styled by the emperor. His brothers, Albert and Leopold, did not assume the title after his death, though they had occasionally done so in his lifetime. The third son of Leopold, however, Ernest the-Iron, revived it. Still he was addressed by the emperor simply as duke. At last the title was formally conferred on them by the emperor Frederick III. in 1453, who himself, as duke, was the first recipient of the imperial gift. Still the usage was not uniform, for he afterwards speaks of himself as duke. The privilege was extended to the Tyrolian branch of the Austrian House in the person of Sigismund. The value of the dignity thus assumed was a cause of contention with Bavaria in 1589. The Austrian view was, that to duke it held the same relation that archbishop does to bishop. The dukes of Austria claimed to have always had precedence over the other ducal houses, and regarded the title as a mere indication of what had been universally acknowledged. Bavaria, on the other hand, relied on the greater antiquity of its dukedom. The contest was decided by the emperor Rudolph II. in favor of Austria, the precedence of which has not since been called in question. Other dukedoms claimed the privilege of being so called, but it was invariably denied by the emperor.

ARCHEGONIUM, n. *âr'kê-gō'nî-ŭm* [Gr. *archê*, beginning; *gonê*, seed, generation]: the female organ of sexual reproduction in mosses, ferns, etc.

ARCHEGOSAURUS, n. *âr'kê-gō-saw'rŭs* [Gr. *archêgos*, founder, or *archê*, beginning; *saurus*, a lizard]: a remarkable fossil Batrachian, but so named by Goldfuss, as constituting the real beginning of reptilian life, which had previously

## ARCHEGOSAURUS.

been considered as not extending below the Permian series of rocks.

From the engraving, it will be seen that the head of the



Archegosaurus:  
a, section of a tooth; b, scales.

A. is protected by a firm dermal skeleton, composed of numerous plates, while the internal primary cartilage seems to have continued unossified. The skull is flattened and triangular, with rounded angles, the front one being somewhat lengthened. The teeth are simple cones, having a labyrinthic structure similar to that of the recent *Lepidosteus*. The vertebral column remains in an embryonic condition; the arches and peripheral elements of the vertebræ are ossified; but the *chorda dorsalis*, which is persistent, is unprotected below. The ribs are short and almost straight, round and slender in the middle, expanded and flattened at the ends. The two pairs of limbs are nearly equal in size, and in structure very much resemble those of the *Proteus*. They have each four long, slender digits, which obviously supported a longish, narrow-pointed paddle, adapted for swimming. Externally, the body was protected by a covering of oblong quadrangular scales, which have been preserved in some specimens.

Four species have been described.

The history of the A. is shortly this: Its remains, found in the Bavarian coal-measures, had been described as those of a fish under the name of *Pygopterus Lucius* (Agassiz). In 1844, H. von Meyer first described it under the name of *Apateon pedestris*. This specimen was found in the coal measures of Münster-Appel, in Rhenish Bavaria, and was supposed by Meyer to be related to the salamanders, and yet not without considerable doubt for he says: 'Its head might be that of a fish, as well as that of a lizard, or of a batrachian.' In 1847, Goldfuss figured and described three distinct species discovered in large concretionary nodules of clay-ironstone, from the coal-field of Saarbrück, giving to them the generic name of A. He considered them to be a transition state between the fish-like batrachia and the lizards and crocodiles. Professor Owen has subsequently described this fossil; he makes it a remarkable connecting link between the reptile and the fish, and on these grounds: It is related to the salamandroid-ganoid fishes by the conformity of pattern in the plates of the external cranial skeleton, and by the persistence of the *chorda dorsalis*, as in



## ARCHELAUS.

the sturgeon, while it is allied to the reptiles by the persistence of the *chorda dorsalis*, and the branchial arches, and by the absence of the occipital condyle, or condyles, as in *Lepidosiren*, and by the presence of labyrinthic teeth, as in *Labyrinthodon*, which, however, also ally it to the ganoid *Lepidosteus*. There is thus in the A. a blending together of the characteristics of reptile and fish in one animal. It occupies a position between, and equally related to, the salamandroid-ganoid fishes on the one hand, and the labyrinthodont reptiles on the other, while the latter lead through the *Lepidosiren* to the perennibranchiate batrachia.

ARCHELAUS, *ár'kē-lā'ūs*: one of the Heraclidæ, who, when driven by his brothers from his native land, fled to Macedon, where he became the founder of a powerful family, of which Alexander the Great was said to be a descendant.

ARCHELAUS: natural son of the Macedonian king, Perdiccas II., came to the throne (after he had murdered the rightful heir) in B.C. 413. His reign was far better than its commencement, as he introduced several salutary measures, and was a generous patron of art and literature. Euripides and Zeuxis frequented his court; and the palace of the monarch was splendidly adorned by the paintings of the latter. It is said that Socrates refused an invitation to proceed thither, having no great respect for the character of A., which was stained with odious vices. He is believed to have been murdered by Craterus, one of his favorites; but the story of his death is told differently.

ARCHELAUS: a general under Mithridates the Great, was sent into Greece with a large fleet and an army of 120,000 men to oppose the Romans B.C. 87. Sulla was sent against him, and besieged him in Piræus, whence A. moved to Bœotia, and here collected all his forces. A battle took place at Chæroneia, when victory declared for the Romans. A. now retreated to Chalcis, where he waited until Mithridates had despatched another army of 80,000 men into Greece. The second fight took place at Orchomenos, in Bœotia, and after two days' contest the whole host led by A. was totally routed by Sulla. A., after hiding for three days in a morass, escaped to Chalcis. After a treaty of peace had been effected between Sulla and Mithridates, A. fell under the displeasure of his monarch, being unjustly suspected of treason, and fearing for his life, as also perhaps disgusted at the return he had received for his many services, he went over to the Romans at the outbreak of the second war, B.C. 81. After this time, he appears no more in history.

ARCHELAUS: son of the former, married Berenice, daughter of King Ptolemæus Auletes (B.C. 56), and ruled over Egypt for the short space of six months during the banishment of Ptolemæus. The usurper lost his life in a battle against Aulus Gabinius, proconsul of Syria. His grandson, also named A., obtained from Marcus Antonius the prov. of Cappadocia, and retained it during the reign of Augustus. Tiberius accused him of political innovations,

## ARCHELAUS—ARCHEOLOGY.

and condemned him to death; but, as he was old and fatuous, his life was spared. He died soon after his trial, at Rome, A.D. 17.

ARCHELAUS: son of Herod, the tyrant of Judæa, succeeded his father in A.D. 1, and maintained his position against an insurrection raised by the Pharisees. His heirship to the throne being disputed by his brother Antipas, A. went to Rome, where his authority was confirmed by Augustus, who made him ethnarch of Judæa, Samaria, and Idumæa. After a reign of nine years, he was deposed by Augustus, on account of his cruel tyranny, and banished to Vienna, in Gaul, where he died. His territories were added to the Roman province of Syria.

ARCHENCEPHALA, n. plu. *âr'kěn-sěf'ă-lă* [Gr. *archo*, I rule, I reign over; *engkephālē*, the brain]: Owen's fourth and highest group of Mammalia, comprising *Man* alone.

ARCHENHOLZ, *âr'kên-holts*, JOHANN WILHELM, Baron von: 1745, Sept. 3—1812, Feb. 28: a German author. After service in the army, he gained his discharge at the close of the Seven Years' War, and passed several years in travel, visiting almost all the principal cities of Europe, and supporting himself by authorship, and, as it was generally reported, also by gambling. He wrote a *History of the Seven Years' War* (2 vols., Berlin, 1793), which when compared with the generally dry style of his German contemporaries deserves praise on account of its narrative interest. He also wrote *England and Italy* (2d ed., Leip. 1787), *Annals of British History* (1789-98), and biographies of Queen Elizabeth of England and Gustavus Vasa of Sweden.

ARCHEOLOGY, etc.: see ARCHÆOLOGY.



## ARCHER.

ARCHER, n. *ârch-ër* [F. *archer*; OF. *archier*, a bowman, —from mid. L. *arcārius*, an archer: F. *arche*, an arch— from mid. L. *archia*, an arch; L. *arcus*, a bow]: one who uses or is skilled in the use of the bow. ARCHERY, n. *ârch'er-î*, the art of using the bow. Archers are soldiers whose weapons are the bow and arrow. Among the ancients specially eminent in this mode of warfare, we may particularize the Thracians, Cretans, Parthians, and Numidians; among the moderns, the Arabians, Germans, and Saracens. The emperor Frederick II. employed Saracenic archers with great effect in his Lombard campaign; and to them is ascribed the victory at Cortenuova in 1237. The archers belonged to the light troops, and their province was to open the battle. The emperor Leo especially lauded the dexterity of the Arabian archers. In later ages, the bow came to be employed in England, where the archers wore light armor, a short sword, and a quiver with twenty or more arrows. At first, these archers fought in small groups; in later years, in large masses. At the battle of Cressy, they formed in divisions of 4,000 men, 200 in line and 400 deep. The archers decided the fate of the day in several battles—such as Cressy and Poitiers (1356), Agincourt (1415), Crévaut (1423), Verneuil (1424), and Rovery (1429). The French archers never equalled the English, in spite of the endeavors of Charles VI. and Charles VII. The latter organized in 1448 the *Franc-archers*, to which corps every parish had to contribute one man; but this measure was attended with so little success that the king was induced to take Scottish archers into his pay, to make any head against the English. The French archers wore a coat of buffalo-hide lined with strong linen, and were accompanied by shield-bearers. In this manner 2,000 bowmen with their shield-bearers fought under the Count de Foix at the siege of Bayonne in 1451. The archers universally belonged to the *élite* of the troops, and received higher pay than the rest. At one period, the arbalest or crossbow was more in favor than the long-bow. See ARBALEST. Long after the discovery of gunpowder, the bow and arrow were still used; as, for example, at the siege of Capua in 1500; and the siege of Peineburg in 1502. Even in 1572, Queen Elizabeth promised to place at the disposal of Charles IX. 6,000 men, of whom the half were archers. The English archers are the subject of frequent mention by our old writers. Chaucer, in his *Canterbury Tales*, speaks of the archer

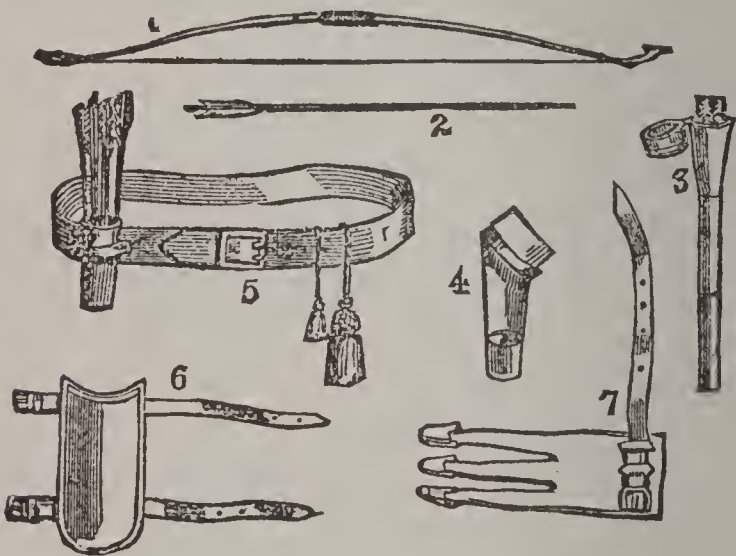
‘ Cladde in cote and hode of grene,  
A sheafe of peacock arwes brighte and kene,  
Under his belt he bare ful thriftilie.  
Wel coude he dresse his takel yewmanlie,  
His arwes drouped not with fetheres lowe,  
And in his hand he bare a mighty bowe.’

In a Treatise on Martial Discipline, by Ralph Smithe, written in the time of Queen Elizabeth, we have a picture of the English archer two centuries after Chaucer’s time: ‘Captens and officers should be skillful of that most noble weapon the long-bow; and to see that their soldiers, according to their draught and strength, have good bowes, well

nocked, well strynged, everie strynge whippe in their nocke, and in the middes rubbed with wax braser, and shutting-glove, some spare strynges trymed as aforesaid; every man one shefe of arrows, with a case of leather defensible against the rayne, and in the same four-and-twentie arrowes, whereof eight of them should be lighter than the residue, to gall or astoyne the enemye with the hailshot of light arrowes before they shall come within the danger of their harquebus shot. Let every man have a brigandine or a little coat of plate, a skull or hufkyn, a maule of leade of five foote in lengthe, and a pike, and the same hanging by his girdle with a hook and a dagger.'

Among the Asiatic Turks, the Persians, the Tatars, and other nations of the East, as well as the American Indians, the bow and arrow are still used as weapons of war. In Europe, they are nearly abandoned for military purposes. The chief differences between the two kinds of weapon employed by the archers of the middle ages are noticed under ARBALEST: BOW AND ARROW.

Archery as an out-door exercise or pastime has in recent years been much practiced in England and the United



Archery Apparatus.

States. During the reign of Charles II., archery was patronized by the court, Tothill Fields being the chief scene of exercise. After his reign, archery fell into disuse for about a century. In 1776, a Mr. Waring revived archery in the neighborhood of London; and very shortly there were several toxophilite or archery societies formed. The system survived till 1793, when another period of inactivity supervened, lasting till 1844. In this last-named year, archery was revived in Yorkshire, and has since extended. A recommendation to the sport is that ladies can take part in it. In the modern exercise of archery, there are several varieties of contests between the antagonistic parties; but the usual variety is target-shooting. In archery-matches, a number of prizes are generally awarded, the principal being for the greatest number of arrows shot into any part of the



## ARCHER.

target, and for the nearest approach to the exact centre. The target has a gold spot in the centre, a red ring around this, then a blue ring, then a black, and outside of all a white ring bordered with green. The merit of the shooting consists in the near approach to the exact centre or 'gold.' Two targets are generally used in a match, on opposite sides of the field, each by one party. The apparatus mostly used at these archery meetings is represented in the cut on page 425. 1 is the bow, varying in weight according to the strength of the person who is to use it; 2 is the arrow; 3 is the quiver, a tin case for holding arrows not immediately in use; 4 and 5 are the pouch and belt for holding the arrows actually in use. The tassel of the belt serves to clean the arrows when dusty. 6 is the brace buckled round the left arm, to protect it from being hurt by the string when shooting; 7 is the shooting-glove, formed to protect the three fingers used in drawing the string. Besides these articles and the target, archers are sometimes provided with a large case called an 'ascham,' fitted up with the necessary drawers and compartments for the reception of the bow, arrows, string, and other necessary accoutrements.

In archery competition, the total number and value of each person's hits are registered on a scoring-card. The shots are usually punctured on a card with a pin, as being preferable to pencil or ink marks; and the mode of ascertaining the value of the hits, which is increased in proportion as they reach the centre, will be seen by the following example:

FORM OF THE SCORING-CARD.

| Names. | Gold. | Red. | Blue. | Black. | White. | Total. | Value. |
|--------|-------|------|-------|--------|--------|--------|--------|
| A      | ..    | .... | ..... | .....  | .....  | 35     | 119    |
| B      | .     | ..   | ..... | .....  | .....  | 26     | 90     |

It appears by the card that A has two in the gold, four in the red, six in the blue, ten in the black, and thirteen in the outer white, making a total of 35. The real value of these is ascertained by multiplying the hits in the gold by nine; in the red, by seven; in the blue, by five; in the black, by three; and by leaving without alteration the number in the white or outer. By this process it will appear that A's numbers, according to the *value* of each circle, amount to 119, and B's to 90—hence A is the winner by 29. But A's *total* might have been less than B's, and still he might have been the winner, provided the shots had lain more towards the gold than B's.

As an instance of the skill which long and careful practice may insure, Mr. Horace A. Ford, who has written an excellent work on Archery, on one occasion, out of 144 shots, made 143 hits—765 score; on another, 144 shots, 137 hits—809 score; and on another. 75 shots, 75 hits—555 score,

## ARCHER FISH—ARCHIL.

**ARCHER FISH:** a name given to certain small East Indian fishes of the Acanthopterygious family of *Squamipennes* or *Chatodontidæ*, which have the faculty of projecting drops of water with sure aim at insects, and thereby causing them to fall into the water, where they are instantly seized as prey. *Toxotes jaculator*, one of these species, is a fish about six or seven inches in length, a native of Java and other parts of the Indian archipelago, and is that to which the name A. F. has been more strictly appropriated. It can project a drop of water to the height of four or five feet. It is the only known recent species of its genus, but there is a fossil one. *Chelmon rostratus*, also a Javanese fish, possesses the same power, and the Chinese in Java keep it in jars for their amusement, causing it to practice its art by placing insects within its range.

**ARCHETYPE**, n. *âr'kě-tip* [F. *archétype*: L. *archētypum*: Gr. *archē* 'upōn, an original—from Gr. *archē*, beginning; *tupos*, form]: the original or model from which copies are made; an ideal primitive type; a pattern. **ARCHETYPAL**, a. *âr'kě-tī'pāl*, original.

**ARCHI-EPISCOPAL**, **ARCHIDIACONAL**, etc.: see under **ARCH 3**.

**ARCHIGRAPHER**, n. *âr-kĭg'ra-fēr* [Gr. *archos*, chief; *graphein*, to write]; a chief secretary.

**ARCHIL**, n. *âr'kĭl* or **ORCHIL** [OF, *orcheil*; *orseille*—from Sp. *archilla*: origin undetermined]; a coloring substance obtained from various species of lichens. The A. is not originally present in the lichens, but is developed during a process of putrefaction and fermentation. The lichens, collected from rocks near the sea, are cleaned, ground into a powder with water placed in tanks, and ammoniacal liquids—such as purified gas liquor or stale urine—added, when by the combined influence of the ammonia, air, water, and the constituents of the lichens, a violet-colored matter is generated, which appears for a time to dissolve in the water, but finally falls to the bottom of the vat in the condition of a moist powder or paste. The latter is then mixed with some substance like chalk or stucco to give it consistence. The lichens which yield the best A. in largest quantity are *Rocella tinctoria* and *fuciformis*. The former is called the *Archil* plant, and is obtained in large amount from the Canaries and Cape de Verd Islands, and the Levant. Another lichen, *Lecanora tartarea*, is collected from rocks in Sweden, and largely exported. It is sometimes called cudbear (q.v.), or cudbear lichen, and sometimes white Swedish móss. A. is soluble in water and in alcohol, to either of which it imparts a violet color, with much of a crimson hue. It is much employed in the dyeing of silks, where a beautiful lilac color is required; but though a brilliant rich hue is imparted to the silken fabric, the color is not permanent, being easily acted upon by the rays of the sun. Hence the A. is seldom used by itself, and the cloth is first dyed lilac by another coloring matter, and is then passed through an A. dye, which imparts a brilliant lilac hue to the cloth. A. is seldom employed



## ARCHILOCHUS.

to dye cotton cloth, but it is often used, with indigo, in the dyeing of woollen cloth, and besides enabling the indigo color to go much further, it imparts its peculiar rich tint to the blue or black cloth or yarn immersed in it; the color, however, so obtained is not so permanent as where the A. is left out. Cudbear (q.v.) and Litmus (q.v.) are analogous to A., and are obtained from the same lichens.

The lichen distinguished by the name of the A. plant or lichen, *Roccella tinctoria*, grows very sparingly on the southern coasts of England, but abundantly on the shores of the Mediterranean and of the neighboring parts of the Atlantic, where it often covers rocks near the sea, so as to form what has been likened to a sort of turf upon them. The Spanish name is *Orchilla*, from which the French *Orseille*, the English A. or Orchil, and (as has been thought) even the botanical name *Roccella*, are derived. It is of a substance between cartilaginous and leathery, roundish, somewhat erect, branching in a dichotomous manner, of a grayish brown color, with powdery warts (*soredia*); the *apothecia* (q.v.) orbicular, flat, horny, almost black, with a scarcely prominent border. That from the Canary Isles is generally regarded as the best. It seldom exceeds the thickness of a pin, and about an inch and a half in length. A less branched and more slender, prostrate, or pendulous variety (*Roccella hypomecha* of Bory de St. Vincent) is common at the Cape of Good Hope and in the island of Mauritius, and appears in commerce with the other, but is inferior. A variety remarkable for its large size, or perhaps a distinct species (*R. flaccida*), is brought from Lima and other parts of the w. coast of South America; it is sometimes as thick as a goose quill, and 6 or 8 inches long, and is of excellent quality. All those, and *Roccella fuciformis*, very generally receive in commerce, and from archil-makers, the name of Orchella weed, the different kinds being distinguished according to the countries from which they are imported. They are also popularly called Dyer's Moss.—*R. fuciformis* now yields perhaps more of the A. or Orchella weed of commerce than *R. tinctoria*. It differs from *R. tinctoria* chiefly in being not rounded, but flat, and in having the *apothecia* very distinctly bordered. It grows in similar situations, and is also a native of Britain, but abundant only in warmer climates, as on the coast of Africa, Madagascar, etc. That from Angola is reckoned the very best.

Among the lichens from which A. is manufactured is the *Pareille d'Auvergne* or *Orseille de terre* (Ground A.) of the French, *Variolaria orcina* or *corallina*, which is gathered for this purpose in mountainous districts of the s. of France and other parts of the s. of Europe, and is also an article of export (with other similar lichens) from Sweden to Holland. But the greater facility with which A. of the finest quality can be procured from the species of *Roccella*, and the increasing abundance of the supply from different quarters, particularly from Angola, tend to diminish the demand for other lichens.

ARCHILOCHUS, *ár-kîl'ô-kûs*, OF PAROS, in Lydia: abt. B.C. 714–676: regarded as the first of the Greek lyric poets,

although the origin of the elegy is claimed for Callinus, a writer whose age seems to have slightly preceded that of A. Glimpses of his life, especially of the calamities that befell him, were frequently given in his writings. His father's name was Telesicles, his mother was a slave called Enipo. At an early age, becoming entangled in political contests, he abandoned his native town, and led a colony of the citizens to Thasos. While here, as he informs us in some extant verses, he lost his shield in a battle against the Thracians, yet not through cowardice. Subsequently he was banished from Sparta, to which he had gone, some say because he had vindicated his conduct in running away from the fight, others because of the licentiousness of his verses. He is said to have gained the laurel wreath at the Olympic Games by an ode in honor of Hercules, but this is doubtful. Having returned to Paros, he took part in the war which broke out between it and Naxos, in the course of which he lost his life, either in battle or by assassination. The Delphian oracle pronounced a curse upon his slayer. Variety, novelty, and satirical bitterness characterized his lyric poems; so much so, that 'Archilochian bitterness' and 'Parian verse' became by words in ancient times. He scourged his enemies in the most merciless fashion, and always displayed the most malicious skill in selecting for his sarcasm the points on which they were most sensitive. It is said that Lycambes, who had promised his daughter Neobule in marriage to A., having failed to fulfil the promise, was so severely satirized by the poet, that to escape ridicule both father and daughter hanged themselves. Among the ancients, A. was ranked with Homer. They dedicated the statues of both on the same day, and placed the head of A. beside that of Homer on the same bust. It is therefore supposed, and with high probability, that there must have been far more in A. than mere vehemence of satire. Even Plato, who was not likely to err on the side of admiration in such a case, calls him 'the very wise'; and Gorgias, the rhetorician, is reported to have said, when Plato sent forth his dialogues against the Sophists, 'Athens has given birth to a new A.' There must have been strong sense and a keen perception of truth in the man, to have won so universal and permanent a reputation. Still the line of Horace—who was a vigorous imitator of him in many respects—proves that 'rage' was considered 'the special faculty' of A.

'Archilochum proprio rabies armavit iambo.'

. *Ars Poetica*, line 79.

'Rage hath armed Archilochus with his own iambus.'

The word *iambus* was in use before the time of A., and was employed to denote a species of rude raillery, such as flashed out spontaneously under the inspiring excitement of the Bacchic and other festivals. A. was, however, the first to reduce these irregular and capricious effusions to fixed rules. See **IAMBICS**. The semi-pentameter, of which he made abundant use, was called after him *Archilochian verse*.



The fragments extant of his poetry have been edited by Bergk in his *Poetæ Lyrici Græcorum* (Leipsic, 1843).

**ARCHIMANDRITE**, n. *âr'kî-măn'drît* [L. and Gr. *archî-mandrî'tēs*—from Gr. *archos*, chief; *mandra*, a fold or enclosure as for cattle, a monastery]: title of the highest order of superiors of monasteries or convents in the Greek Church. See **ABBOT**. The Russian bishops are chosen from among the archimandrites.

**ARCHIMEDEAN**, a. *âr'kî-mē'dē-ăn*: pertaining to *Archî-mēdēs*, a great mathematician of ancient times. **ARCHIME'DEAN SCREW**, a machine for raising water, consisting of a tube coiled spirally round a revolving axis.

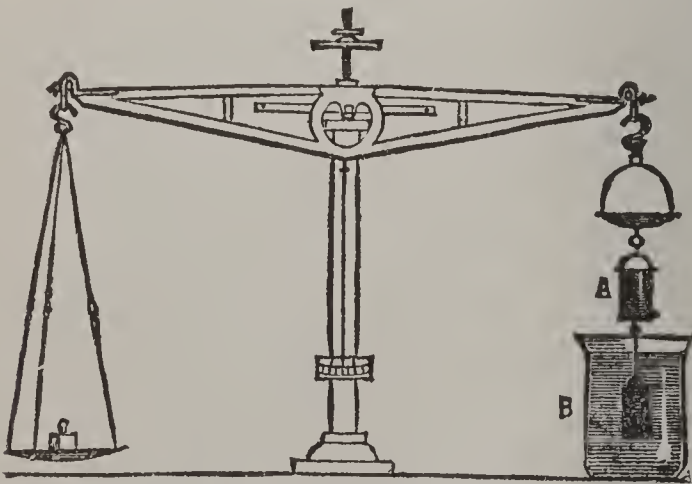
**ARCHIMEDES**, *âr-kî-mē'dez*: the most celebrated of ancient mathematicians; B.C. 287—212; b. Syracuse. He is said to have been a kinsman of King Hiero, though he does not seem to have held any public office, but devoted himself entirely to science. In regard to mathematics, we cannot estimate fully the merits of A. without a more exact knowledge of the state of the science as he found it; we know, however, that he enriched it with discoveries of the highest importance, on which modern mathematicians have founded their methods of measuring curved surfaces and solids. Euclid considers only a few curved figures in relation to one another, but without comparing them with rectilinear surfaces and solids. The theorems necessary to this transition are laid down by A. in his treatises 'on the Sphere and Cylinder,' 'on Spheroids and Conoids,' and 'on the Measurement of the Circle.' His demonstration that the area of a segment of a parabola is two thirds of the enclosing parallelogram, is the first real example of the quadrature (q.v.) of a curvilinear space. In his treatise on spirals, he rises to yet higher investigations, which, however, are not very easily understood even by masters of the subject.

A. is the only one of the ancients that contributed anything satisfactory on the theory of mechanics and on hydrostatics. He first established the truth that a body plunged in a fluid loses as much of its weight as is equal to the weight of an equal volume of the fluid. See **ARCHIMEDES, THE PRINCIPLE OF**. It was by this law that he determined how much alloy the goldsmith whom Hiero had commissioned to make a crown of pure gold had fraudulently mixed with the metal. The solution of the problem suggested itself to him as he was entering the bath, and he is reported to have been so overjoyed as to hasten home without waiting to dress, exclaiming: 'I have found it! I have found it!' (*Eureka! Eureka!*) Practical mechanism seems to have been an equally new science in the days of A.; for his boast, that if he had a fulcrum or stand-point he could move the world, betrays the enthusiasm with which the extraordinary effects of his newly invented machines inspired him. Among the numerous inventions ascribed to A. is that of the endless screw, and the *cochlea* or water-screw (see **ARCHIMEDES SCREW**), in which the water is made in a manner to ascend by its own gravity. During the siege of

## ARCHIMEDES.

Syracuse by the Romans, he exerted all his ingenuity in the defense of the city. Polybius, Livy, and Plutarch speak with astonishment of the machines with which he opposed the attacks of the enemy. But while giving detailed accounts of his other contrivances, they say nothing of his having set fire to the ships by means of mirrors, a story which is not very probable in itself, and rests on later narratives. When the Romans took the city by surprise, A., according to tradition, was sitting in the public square lost in thought, with all sorts of geometrical figures before him drawn in the sand. As a Roman soldier rushed upon him, he called out to him not to spoil the circle. But the rude warrior cut him down. According to his own direction, a cylinder enclosing a sphere was engraved upon his tombstone, in commemoration of his discovery of the relation between these solids—a discovery on which he set particular value. When Cicero was in Sicily as quæstor (75 B.C.), he found the tomb hid among briars. His extant works have been edited by Torelli (Oxf. 1792), and Heiberg, with a Latin translation (Leip. 1881). There is a French translation by Peyrard (Paris, 1808), a German by Nizze (Strals. 1824). The *Arenarius* was translated into English by G. Anderson (Lond. 1784). Its object is to prove that it is possible to assign a number greater than that of the grains of sand that would fill the sphere of the fixed stars, the diameter of which A. assumes at a certain number of stadia. The difficulty lay in expressing such a vast number by means of the clumsy notation of Greek arithmetic, and the device by which the difficulty is eluded is considered as affording a striking instance of A.'s genius.

ARCHIMEDES, THE PRINCIPLE OF: one of the most important in the science of Hydrostatics, so called because the discovery of it is generally ascribed to the Syracusan philosopher. It may be thus stated: A body when immersed in



a fluid loses exactly as much of its weight as is equal to the weight of the fluid it displaces; or: A fluid sustains as much of the weight of a body immersed in it as is equal to the weight of the fluid displaced by it. It is proved experimentally in the following way. A delicate balance is so arranged that two brass cylinders, A and B, may be suspended from one of the scale-pans, the one under the other.



## ARCHIMEDES SCREW.

The lower cylinder, B, is solid, or closed all round, and fits accurately into the upper cylinder, A, which is hollow. When the two cylinders are placed under one scale, pan-weights are placed upon the other until perfect equilibrium is obtained. The cylinder B is now immersed in water, and in consequence of the buoyant tendency of the water exerted upon it the equilibrium is destroyed; but it may be completely restored by filling the hollow cylinder A with water. The amount of weight which B has lost by being placed in the water is thus found to be exactly the same as the weight of a quantity of water equal to its own bulk, or, which is the same thing, to the quantity of water displaced by it. When bodies lighter than water are wholly immersed in it, they displace an amount of water of greater weight than their own, so that if left free to adjust themselves they swim on the surface, only as much of their bulk being submerged as will displace a quantity of water weighing the same as themselves. Accordingly, while bodies heavier than water displace, when put into it, their own bulk, bodies lighter than water displace, when allowed to float on the surface, their own weight of the fluid. Bodies of the same weight as water, according to the principle of Archimedes, have no tendency to rise or sink in it, for the water displaced by them weighs precisely the same as they do. The pretty scientific toy called the Cartesian Diver is intended to illustrate this. Although the principle of Archimedes is generally established with reference to water, its application extends equally to bodies immersed in air or any other fluid.

ARCHIMEDES SCREW (called also the *spiral pump*): machine for raising water, said to have been invented by Archimedes, during his stay in Egypt, for draining and irrigating the land. Fig. 1 represents it in its simplest form.

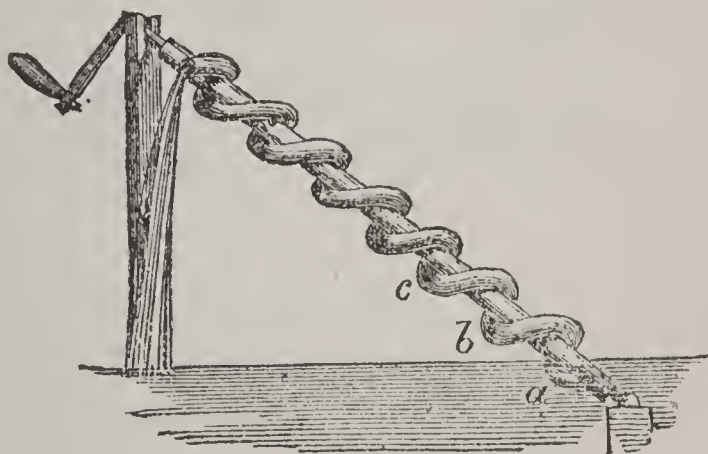


Fig. 1.

This consists of a flexible tube bent spirally round a solid cylinder, the ends of which are furnished with pivots, so as to admit of the whole turning round its axis. The machine is placed in an inclined position, so that the lower mouth of the tube may dip below the surface of the water to be raised. In the position represented in the figure, the lowest bend (*a*) of the tube will be filled with water, and if now

## ARCHIPELAGO.

the handle be made to turn in the direction of the hands of a watch, the mouth of the spiral tube will be raised above the surface; and the water inclosed in the tube, having no means of escape, will flow within it until, after one revolution, it will occupy the second bend, *b*. The first bend (*a*) has meanwhile received a second charge, which, after a second revolution, flows up into the second bend (*b*), and takes the place of the first charge which has now moved up to the third bend, *c*. When, therefore, as many revolutions of the cylinder have been made as there are turns in the spiral tube, each of the lower bends will be filled with water; and in the course of another revolution, there being no higher bend for the water of the first charge to occupy, it will flow out of the tube by its upper mouth. At each succeeding revolution, the lowest bend will be charged, and the highest discharged. It will be seen from the figure that there is room to dispose a second tube side by side with the first, round the cylinder, in which case the screw would be called double-threaded. In the ordinary construction of these machines, the cylinder itself is hollowed out into a double or triple threaded screw, and inclosed in a water-tight case, which turns round with it, the space between the threads supplying the place of such tubes as are seen in Fig. 1. Fig. 2 represents a double-threaded A. S. of this description, with the case removed in front. It is sometimes found convenient to fix the exterior envelope, and to

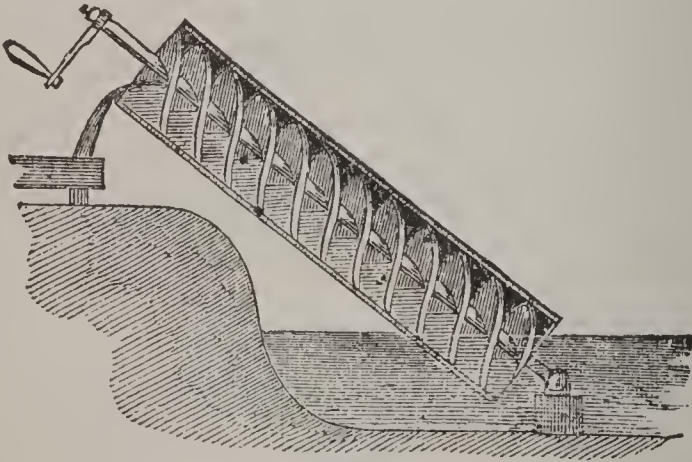


Fig. 2.

make the screw work within it, the outer edge of the latter being as close as possible to the former without actual contact. This modification of the A. S. receives the name of water-screw, and frequently of Dutch screw, from its being extensively used in Holland for draining low grounds.

**ARCHIPELAGO**, *n.* *âr'kî-pêl'ă-gô* [Gr. *archos*, chief; *pelâgos*, sea: It. *arcipelago*]: the Ægean Sea; any sea closely interspersed with islands—now frequently applied simply to a cluster of islands. **ARCHIPELAGIC**, *a.* *âr'kî-pêl-ăg'ik*, pertaining to an archipelago.

**ARCHIPELAGO**: a term applied originally to that gulf of the Mediterranean which separates Greece from Asia; but now extended to any sea, like it, thickly interspersed with islands, or rather to the group of islands themselves. The



## ARCHITECT—ARCHITECTURAL PAINTING

islands in the Greek Archipelago or Ægean Sea consist of two groups, called Cyclades and Sporades, the first from their being massed after the manner of a circle, the second from their being scattered in something of a line. The former lie to the e. of Southern Greece, while the latter skirt the w. of Asia Minor.

Of the Cyclades the principal islands are Lyra, Kythnos, Thera, Tenos, Andros, Naxos, Melos, and many more of inferior size. They all belong to *Greece* (q.v.). The chief islands of the Sporades are Scarpanto, Rhodes, Cos, Patmos, Nicaria, Samos, Scio, Metelin, Lemnos, Imbros, Samothraki, Thasos, and many more of inferior size. These all belong to Turkey, and constitute a separate vilayet of the empire. For the more considerable islands of both groups, and for the other Archipelagoes, loosely so called, see their respective titles.

It is noticeable that the islands of the globe rarely stand alone. With very few exceptions, they may all be classified into clusters. In most clusters, again, there is generally more or less of similitude between the different members of each—similitude sometimes of one kind, and sometimes of another. Perhaps the similitude most obvious even on the face of an ordinary map is that, really like the links of a chain, the members of a cluster have their lengths, as distinguished from their breadths, in one and the same direction. In the West Indies, for instance, look at the Bahamas, and look also at the Antilles, Greater and Lesser. In the East Indies, again, the same thing is seen in carrying the eye from the n. end of the Philippines to the n. end of Sumatra, or even on the Andamans. Lastly, on the opposite coasts of the Upper Pacific, observe the American side upwards from the s. end of Vancouver's Island to Mount St. Elias, and the Asiatic side downwards from the upper extremity of Kamtchatka—which is almost an island—through the Kuriles, to the lower extremity of Japan.

ARCHITECT, n. *âr'kî-těkt* [F. *architecte*—from L. *architectus*—from Gr. *architectōn*, a chief builder—from Gr. *archos*, chief; *tektōn*, a builder]: one who designs and plans buildings; a former or maker. ARCHITECTIVE, a. *âr'kî-těktiv*, used in, or proper for, building. AR'CHITECTON'IC, a. *-těk-tōn'ik*, that has the power or skill to build. AR'CHITECTON'ICS, n. *-iks*, the science of architecture. ARCHITECTURAL, a. *âr'kî-těk'tūr-ăl*, pertaining to the art of designing buildings. ARCHITECTURE, n. *âr'kî-těk'tūr*, the art of planning and constructing houses or ships; the appearance of them when built or framed.

ARCHITECTURAL PAINTING: painting having for its subjects the exteriors or interiors of remarkable buildings; churches, castles, streets in cities, etc. It is mentioned by Vitruvius, but is comparatively a modern art. Benozzo Gozzoli, Ghirlandajo, and the Venetian school, cultivated this department of art in the middle ages; and Pinturicchio, by order of Pope Innocent VIII., painted a series of views of cities in the style of the Flemish school, which, under the brothers Van Eyck, had distinguished itself by careful

treatment of architectural backgrounds, etc. For a long time A. P. was regarded only as accessory to other styles of art; but at the close of the 13th c., P. Neefs, in his views of the interiors of Gothic churches, gave to this branch of the fine arts an independent form; and Steenwyck the younger, in the following century, extended its application in his views of the interiors of prisons, of which his picture of *Peter Liberated from Prison* is an example. The art was still further extended and cultivated by Van der Heijden, Blick, Van Deelen, E. de Ville, Johann Gehring, and others, who painted views of church interiors in the Italian style, palaces, and chambers. The interior view of the Church of Amsterdam, painted by Ruisdael, deserves especial notice. In the 18th c. the Venetian Canale and his nephew Bellotto (generally known by the name of Canaletto) painted many views of cities, but especially of the canals and buildings of Venice. Collections of their numerous works are found at Dresden, Woburn Abbey, etc.

In recent times, A. P. has been very successfully cultivated in Germany, France, England, Holland, and Belgium. Schinkel is celebrated for his fine union of classical taste with richness of decorative invention. His two most striking works are St. Peter's, and the Duomo at Milan; Paul Gropius has shown great talent in his Cathedral at Rheims, built in honor of Joan of Arc. His dioramas are well known; and Domenico Quaglio (d. 1837), throughout his innumerable compositions, has exhibited an exquisite appreciation of perspective and of the poetical arrangement of details. Among modern architectural painters may be mentioned—in England—Prout (views of Italy, Germany, etc.); Roberts (whose genius has sought for its materials in Spain and the East, and who paints the architecture of foreign lands with rare truthfulness and vigor), Mackenzie, Goodall, Williams, and the water-color painters Haghe, Chase, Howse, and others; in France—Granet (d. 1849), the most celebrated art painter of the new French school; and the water-color painters Ouvrié, Garney, Rochebrune, and Villeret; in Italy—Migliara and Nehrlich (a German who has been styled 'the modern Canaletto'); in Germany—Von Bayer, Hasenpflug of Halberstadt (who paints beautifully old cloister-alleys under winter effects), Ainmuller, Vermeersch, Pulian of Düsseldorf (who displays great skill in the representation of old streets and time-worn churches), Conrad, Gärtner, Groeb, Helfft, Dietrich, etc.; in Holland and Belgium—Waldorp, Carsen, Boosborn, Von Haanen, Ten Kate, Springer, and Bossuet.



## ARCHITECTURE.

AR'CHITECTURE: art of planning and constructing. A. is usually divided into Civil, Military, and Naval. In the present article the first is considered: for the other two see FORTIFICATION: SHIP-BUILDING. Civil A., in the widest sense, may be regarded either from an artistic, a scientific, or a utilitarian point of view. In the first case, as a means of giving external form and sensible expression to mental conceptions or ideas, it is a branch of æsthetics, or of the fine arts properly so called (see ART), and takes rank with sculpture and painting; in the second case, it consists in a knowledge of certain laws of physical nature, and a consequent power of calling them into play, or counteracting their operation, and is consequently a branch of that wider department of science to which the name of *Mechanics* (q.v.) is given; whereas in the last it becomes a practical art, which has for its object the application of the principles, both artistic and scientific, which A. embraces, to the elevation of national and individual character, and the increase of the physical comfort and well-being of mankind. But though it admits of being thus analyzed or separated in thought, it must not be imagined that A. can exhibit in practice any one of these principles to the exclusion of the others. The abstract conception of all-pervading deity, as embodied in the Greek temple—the religious aspirations after a personal God, as shadowed forth in the Gothic cathedral—can be realized only in accordance with the principles of mechanics, and the most rigorous adaptation of means to ends; whereas, in an opposite direction, the kraal of the Hottentot, the hut of the Indian in the American wilderness, or even the vulgar chimney-stack in the dingy manufacturing suburb, if properly constructed for their respective purposes, will be found to have obeyed such æsthetical principles as they may have come in contact with. Nature is not self-contradictory; and art and science, beauty and utility, when rightly understood, are never in conflict. A celebrated German writer and thinker (F. Schlegel) has described A. as 'frozen music;' and the comparison is just; for music, though apparently the freest and most lawless, is in reality the most rigorously scientific of the arts. But though a strict adherence to all the principles of A. be indispensable to every genuine architectural structure, whatever be its object, it does not follow that equal prominence must be given to each of these principles on every occasion. If a building has for its primary object the expression and commemoration of such feelings as grief, gratitude, devotion, or the like, this object manifestly will be best attained by subordinating the scientific and utilitarian to the æsthetic principles of A.; and the reverse will be the case where mere convenience, and also, though in a lesser degree, where convenience, in combination with beauty or magnificence, is sought. It is in a great measure by the prominence which they have given to one or other of these principles, that different nations have displayed their diversities of character in their A. The speculative and poetical character of the Greeks was exhibited in their temples, while their preference of the state to the individual appeared in the fact that these structures were designed for the worship of

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the protecting divinity of the city by the citizen of the state, not for the worship of a personal God by the individual man. Among the Romans, terrestrial power and material aggrandizement were the exclusive national aspirations, and consequently their A. had their own honor and glory primarily in view. The basilicas, amphitheatres, and triumphal arches of the Romans were their own; but the temples which they raised in honor of their gods were little else than imperfect copies from the Greek, with scarcely any assignable national characteristics. Then in mediæval times, though, on the revival of spiritual tendencies, æsthetic principles again became prominent, they exhibit themselves under totally different forms; and the distinctions between heathen and Christian thought could scarcely be more distinctly stated in words than they are exhibited to the eye in the difference between a Greek temple and a Gothic cathedral. Even the relation which subsists between Christian and Mohammedan A. (Gothic A. and Arabian A., q.v.) indicates the fact that Mohammedanism was but a sort of bastard Christianity. Domestic life appeared in full purity and vigor only in modern times; and then only do the utilitarian principles of A. prevail over the æsthetic. But apart from the mental characteristics and tendencies of a people, many other circumstances modify their A. Of these, one of the most important is climate. Arrangements for the permanent and commodious residence of a family within doors could not be expected to attain much perfection among a race like the Greeks, whose life was spent in the open air; and the climate of Holland, as well as the genius of the people and the character of their occupations, has had much to do with the fact that Dutch A. has rarely risen above a town-house. Following thus the peculiarities of national character and circumstances, it is obvious that the more widely these differ in any two nations, the more dissimilar will be the styles of A. which they produce respectively. Moreover, it is apparent that the higher the stage of national development, the more marked will be the character which the A. of the people will assume. A. thus bears a strict analogy to language. Both are an expression of thought, and in the one and in the other the richness, variety, and precision of the expression will be in proportion to the quantity and quality of the thought to be expressed. Further, in the fact that all genuine A. is the expression of the ruling national ideas and forms of thought of some one particular people, we perceive the reason why a building compounded of several styles should be characterless and unpleasing; and why this should be more and more the case, the more characteristic the styles compounded, and the greater the equality preserved among them. The Doric pillar in itself, still more, perhaps, the Roman adaptation of it, is the simplest and most rudimentary of all pillars; and what we are in the habit of calling Saxon is the simplest and most rudimentary of all the styles of Gothic A.; and hence the introduction of a few Tuscan pillars considerably modified into a Saxon or Romanic church does not awaken feelings of very decided repugnance, whereas an attempt to combine equally the



beauties of the Parthenon and of Cologne Cathedral in the same building would be revolting. For the origin and development of the different styles of A., see EGYPTIAN A.: INDIAN A.: GREEK A.: GOTHIC A.: ARABIAN A.: also ARCH: PILLAR: ARCHITRAVE: etc. The attempt may here be made to trace the earlier stages through which A. passed in the historical nations, before it reached the point at which it afforded the means of expressing the feelings or supplying the wants of mankind.

1. The earliest stage of monumental A. in every part of the world seems to have been that in which it supplied to the existing generation the means of setting a mark on the face of the earth, of a nature so ineffaceable it should continue visible to future generations. No attempt was yet made to tell a tale either by the form of the monument, or by any figure or inscription engraven on it. Apart from the tradition intended to accompany it, it was speechless—confessedly unintelligible. But it is easy to see how powerful would be the effect of such an erection in preserving that tradition from oblivion, and fixing it down to the particular locality; for so long as a conspicuous object existed, obviously the work of human hands, the cause of its existence would be a subject of curiosity, which could be gratified only by inquiries that must lead to a recital of the events intended to be commemorated. It was with this view that Joshua (xxiv. 26) took a stone, and set it up under an oak that was by the sanctuary of the Lord—‘And said unto all the people: Behold, this stone shall be a witness against us; for it hath heard all the words of Jehovah which He spake unto us.’ To this primary class of monuments belong those tumuli or barrows, and conical heaps of stones called cairns, carns, or kearns, which, when they occur in Britain, are perhaps rightly ascribed to the Celtic portion of the early inhabitants, but which there is much reason to believe have been erected by every race at a certain stage of their progress. The barrow, it is true, is not wholly destitute of architectural arrangements. Occasionally it contains a passage or narrow gallery leading to a square enclosure or small chamber, in which the remains of bones, and of rude urns, drinking-cups, and other articles, sometimes of Roman or Brito Roman manufacture, are found. The barrows are always, however, of the rudest and most inartificial construction, and in considering them we are only on the threshold of architectural science.

2. The earliest class of erections to which this title can with any propriety be given are those commonly spoken of as Druidical temples. These consist generally of separate stones, often of enormous size, raised on their ends, sometimes in a circle, and at other times so as to enclose an oblong space, which in some cases is rooted in by horizontal slabs. These roofing-stones are frequently of such prodigious weight as to give rise to many conjectures regarding the mechanical means by which, and the mechanical knowledge of those by whom, they were placed in the positions in which we see them. These strange, and, to us, almost wholly unintelligible remains of antiquity, when of great

## ARCHITECTURE.

extent, assume an air of savage and gloomy majesty. Of this the most conspicuous instance anywhere to be found is that of Stonehenge (q.v.), in Salisbury Plain in Wiltshire. Wherever a Celtic population existed, these monuments are to be found. Drudical monuments are more common in France than in England; and in France, as might be expected, they exist in the greatest numbers and variety in Brittany (q.v.), though none of them approach the magnitude, or, in some respects, the workmanship of Stonehenge. The Celtic monument of Brittany are of different classes, and have received different names—that which is most architectural in character being the dolmen, or cromlech, as it is called in England. The cromlech consists generally of two rows of perpendicular stones, arranged so as to fit somewhat closely to each other, and covered with horizontal roofing-slabs, thus forming a chamber, generally of such height as to allow a man to walk through it upright. But the largest and most perfect specimen of the dolmen is to be seen, not in Brittany, but in the neighborhood of Saumur on the Loire. It measures more than 80 ft. in length. To the same early stage in the science, though probably to a much earlier period in point of time, are to be referred those cyclopean walls and fortifications which at Tiryns and Mycenæ in Argolis excited the wonder of the later Greeks; the Etruscan walls at Fiesole; and the similar structures found both in Central and S. America.

3. The next stage in advance of that primeval and pre-historic one of which the traces are thus so widely spread, is that at which the science seems to have culminated in all but the classical nations of antiquity, and those races which have had the benefit of their genius and invention. We have here an accurate measurement of parts, and a corresponding division of the building. The pillar also makes its appearance, though it is by no means used with the same freedom, nor does it exhibit the same variety of form to which it attained in Greek A. This stage was attained by the inhabitants of Central and S. Amer. before its discovery by Europeans; and in Mexico, even by the Toltecs, an earlier race, which had given way before the Mexicans of the days of Cortez. Peruvian A. exhibits neither columns nor arches; but the remains of the palace at Mitla possessed a portico with plain cylindrical columns; and the walk were covered with rude sculpture. In the cloisters of a building at Palenque, a species of inartificial triangular arch, formed by courses of stones projecting over each other, was found. It is very instructive as showing the natural, and, so to speak, necessary character of certain architectural forms at certain stages of national development, to find that the pyramid, which is little more than a regularly constructed cairn, is found even more frequently in Mexico than in Egypt; and whether or not it was the primary form of the pagoda of India, it certainly formed the basis both of Mexican and Egyptian A. The keen discussions as to the priority of date of Indian and Egyptian A. lose much of their importance when a race is found acting in all probability independently of both, starting from the same primary



## ARCHITRAVE—ARCHIVOLT.

form as the one, and in the discovery of the pillar and the arch making two of the most important of the further steps in advance to which they respectively lay claim. Keeping these facts in view, it seems, moreover, that something more is required to prove a historical connection between Doric and Egyptian A. than the circumstance that the columns which they respectively employ possess a base, a shaft, and a capital, or that both are used to support an entablature. Even the long unbroken horizontal lines which seem to indicate an affinity between the architectural styles of Egypt and of Greece, and which distinguish them both so sharply from the Christian A. of mediæval Europe, may be the result rather of a similarity of circumstances than of an identity of origin. Though these styles agree in having columns, and though the columns support horizontal entablatures in each they disagree in the forms of the columns, in the character of the entablature, and, indeed, in almost every other particular. While Greek pillars taper towards the top, and the walls are vertical, in Egyptian buildings the reverse is the case, the pillars being vertical and the walls sloped. When the effect of a whole Greek building, surrounded by a colonnade, and of an Egyptian building is considered, a certain similarity appears—the base in each case being wider than the upper part; but the result is produced in the one case by sloping the pillars, and in the other by sloping the walls, the external edges of which form a slightly acute angle with the base of the building. The great distinction, however, between the A. of Egypt and Greece consists in the stages which they respectively reached. The A. of Egypt retained throughout a character of gloomy strength, and never attained the lightness, freedom, or variety of that of Greece. In one case, the traditionary forms continued throughout to dominate and subdue the free spirit of art; in the latter, art triumphed over tradition, and owned no laws but its own. It is at this point that the distinction appears between the stage of A. of which Egyptian may be considered the type, and that ultimate stage reached by the Greeks in one direction and by the various Germanic nations in another. See ARABIAN A.: BYZANTINE ART: GOTHIC A. For the profession of architecture, see BUILDING.

**ARCHITRAVE**, n. *âr'kî-trāv* [It. *architrave*—from Gr. *archos*, chief: It. *trave*, a beam of timber—from L. *trabem*, a beam]: in *arch.*, that part of the entablature which rests immediately upon the capitals; a molding above a door or a window, and the like.

**ARCHIVES**, n. plu. *âr'kî-vîz* [F. *archives*—from L. *archivum*, a depository for important documents—from Gr. *archeion*, the public hall]; the place where public documents are kept; a collection of records or documents. See RECORDS. **ARCHIVAL**, a. *âr-kî'vāl*, of or containing archives. **ARCHIVIST**, n. *âr-kî'vîst*, a keeper of records.—**SYN.** of 'archives': records; chronicles; registers.

**ARCHIVOLT**, n. *âr'chî-vôlt* [It. *archivolto*—from *architrave*, and *volto*, a vault, an arched place]: in *arch.*, a band

## ARCHON—ARCHYTAS.

or group of moldings and ornaments on the face of a classical arch; a mass of moldings on the faces and soffits of mediæval arches.

ARCHON, n. *âr'kôn* [Gr. a ruler, a prince]. the highest magistrate in ancient Athens. The government was originally monarchical; but on the death of Codrus (q.v.), the Athenians, according to the traditionary account, resolved that no one should succeed him with the title of king (*basileus*), and therefore appointed his son Medon with the title A. (ruler). The office was at first for life, and confined to the family of Medon; but B.C. 752, the time of office was limited to ten years; and in 714, the exclusive claims of Medon's family to the office of A. were abrogated, and it was thrown open to all persons of noble birth; afterwards to all citizens, without distinction of rank (B.C. 477). In 683, the office had been made annual, and the number of archons had been extended to nine. The year was named from the first A., to the second, styled Basileus, belonged the care of religious affairs; the third was Polemarchos, or commander-in-chief; and the remaining six, having to conduct all criminal trials, were styled Thesmothetæ, or lawgivers.—Among the Jews, during the time of their subjection to the Romans, the title of A. had various meanings; but was generally given to the members of the Sanhedrim or supreme council.—In the mystical jargon of the Gnostics, the term A. was frequently employed, and hence one of their sects, especially opposed to Judaism, received the name ARCHON-TICS. See Gnostics.

ARCHYTAS, *âr kî'tās*, of Tarentum: one of the most illustrious men of antiquity; lived abt. B.C. 400. His father's name was Mnesagoras. A. is said to have been a contemporary of Plato, and on one occasion to have saved the life of the latter when the tyrant Dionysius wished to put him to death. His public career was glorious. He was seven times elected general of his city, though it was customary for the office to be held only for one year; and in every campaign which he undertook, he was victorious. His civil administration was equally fortunate. Affairs of the highest moment were repeatedly intrusted to him; and yet, though deeply skilled in philosophy and politics, he had a childlike simplicity of character. He was drowned on the Apulian coast. A.'s virtues were as conspicuous as his talents. He paid the most humane attention to the comfort and education of his slaves, and although one of the greatest geometricians, he did not disdain to make a rattle for the amusement of his children. He solved the problem of the doubling of the cube, and secured almost the reputation of a magician by his numerous mechanical contrivances, the most wonderful of which was the flying pigeon. A Pythagorean in philosophy, he is generally supposed to have exerted a considerable influence on Plato, and some affirm that even the gigantic understanding of Aristotle was indebted to him for the idea of his categories. Only fragments of his writings remain. They relate to metaphysics, ethics, logic, and physics.



## ARCIDOSSO—ARÇON.

**ARCIDOSSO**, *âr-chê-dôs'sô*: town of Central Italy, prov. of Grosseto, 23 m. n.e. from Grosseto, on a feeder of the Umbrone, among the Apennines. Pop. (1881) 1,937.

**ARCIS-SUR-AUBE**, *ar-sê'sür-ôb*: small town in the French department of Aube; lat. 48° 32' n., long. 4° 8' e.; remarkable for the battle, 1814, March 20–21, between Napoleon and the allied forces under Prince Schwartzberg. The battle, beginning with several skirmishes on the first, and ending in a general engagement on the second day, when the French retreated over the Aube, was not in itself very important. But Napoleon now formed the plan of operating in the rear of the Allies, and left the road to Paris open; assuming that they would not venture to proceed without attempting first to secure their rear. The Allies marched, nevertheless, on the capital, and thus decided the campaign. Pop. abt. 3,000.

**ARCOGRAPH**, n. *ârk'ô-gräf* [L. *arcus*, a bow: Gr. *graphein*, to grave, to describe]: an instrument for describing an arc without the use of a central point; a cyclograph.

**ARCOLA**, *âr-kô'la*, or **ARCO'LE**: village on the left bank of the Adige, Northern Italy, 15 m. e.s.e. of Verona; famous for the victory gained by Bonaparte over the Austrians, 1796, Nov. 17. The Austrians, relieved by the retreat of Moreau from the Rhine, had begun to take the offensive in Italy, and General Alvinczy appeared at the head of 50,000 men, with the main body of which he advanced to Caldiero, and threatened Verona. Bonaparte, recognizing the danger, descended by night the course of the Adige, crossed that river at Ronco, and was thus in a position to threaten the left flank of Alvinczy's army, which was posted at A. A causeway leads from Ronco across the morasses to A., before reaching which the road crosses the small stream of the Alpon by a narrow bridge. This bridge was defended by the Austrian general Mitrowsky, with fourteen battalions of infantry, and two squadrons of cavalry. On the 14th of November, Augereau attacked the bridge with two battalions of grenadiers, but being exposed in flank to the Austrian fire was obliged to withdraw. Bonaparte now seized the standard himself, and rushed on the bridge, followed by the grenadiers; but again the fire of the Austrians, who were in much greater force than the French, made it necessary to draw back. The struggle was renewed on the 16th, with a similar result; and it was only on the 17th that the French succeeded in getting possession of A., not, however, by forcing the bridge, but by sending a column across the Alpon, lower down, and getting in rear of the Austrians. On this Alvinczy was obliged to retreat to Vicenza. It fared no better with the other column of the Austrians under Davidovich. In this series of battles the Austrians lost 18,000 men killed, and 6,000 prisoners. The French loss was 15,000.

**ARÇON**, *âr-sôn'*, **JEAN CLAUDE D'**: 1733–1800; b. Pontarlier: a distinguished French engineer. He was originally intended for the priesthood, but on manifesting a decided preference for the study of Vauban, his father, an eminent

## ARCOS DE LA FRONTERA—ARCOT.

jurisconsult, consented to his choice of a military profession. In 1754, he entered the Military School at Mézières, and in the following year he passed as an engineer. During the Seven Years' War, he acquired considerable reputation, especially in the defense of Cassel. His fertility of invention was surprising, and his writings show a rich and vigorous genius. He was even bold enough to question the wisdom of certain strategical propositions of the Great Frederick. But his most famous scheme was that by which he hoped to reduce Gibraltar, then in the hands of the English, and defended by Governor Elliot. He contrived floating batteries, incombustible, and not liable to sink, which, however, were not successful, though this is mainly to be attributed to the fact of his efforts being indifferently supported. When the French, under Dumouriez, overran Holland, A. took several strongly fortified places, among others Breda. After this, he retired from public life, and confined himself to the literature of his profession. His most important work is *Considérations Militaires et Politiques sur les Fortifications* (Paris, 1795). In 1799, Bonaparte called him to the senate, but he died the year after.

ARCOS DE LA FRONTERA, *âr'kôs dā lâ frôn-tā'rā*: town on the right bank of the Guadalete, Andalusia, Spain. Its principal manufacture is that of tanned leather, which was the first established in Andalusia; thread and ropes are also made. A. has a wild and romantic situation, which harmonizes well with the picturesque garb of the inhabitants, who still wear the old national costume. It was called Arcos, from being built in the form of a 'bow'; and after Alfonso-el-Sabio had rescued it from the Moors, it received the additional name of *de la Frontera*, from its frontier position, being in the vicinity of the Moorish kingdom of Granada. Almost impregnable by nature, it was further more embattled with walls and towers, part of which still remain, and afford a magnificent view of the Ronda Mountains. The rich plains that lie below the rocky town are famed in the Spanish ballads for their breed of war-steeds, 'Arcos barbs.' Pop. (1894) 16,280.

ARCOT, *âr-kōt'* properly ARKÁT: city of Hindustan, in the presidency of Madras, cap. of the dist. of n. Arcot; on the right bank of the Palar, a river which, rising in Mysore, is, in the rainy season, about half a mile wide before the town. It is in n. lat. 12° 54', and in e. long. 79° 24'; 65 m. from Madras. Besides the military cantonment, which can accommodate three regiments of cavalry, A. contains some mosques in a passable state of repair, and the ruins of the Nawaab's palace. A. is noticeable chiefly for its history. It was the spot where Clive first firmly established his military reputation. With a force of 300 Sepoys, 200 Europeans, and three field-pieces, he marched against A., which was garrisoned by 1,100 men; and after having taken it, he stood a siege of fifty days against thousands of assailants, amid hardships and privations of every description. Pop: 50,000, one-fourth Mohammedans.

ARCOT: a portion of the presidency of Madras. It con-



## ARCTIC—ARCTIC HIGHLANDS.

sists of two districts, the northern and the southern, of which the respective areas are 7,256 sq. m. and 4,873, and the respective populations (according to the census of 1891) 2,180,487 and 2,162,851.

As most of the rivers are destitute of water in the dry season, there are thousands of tanks in A. Some of them are of an enormous size; that of Cavery-pak, in particular, measures eight m. by three. These tanks are indispensable, as well for irrigation as for domestic use. The hot and parching winds from the west, sweeping down the valleys of the Eastern Ghaats, are often fatal to birds on the wing, and also to human beings when exposed for any length of time. Glass cracks and flies in pieces, and wood shrinks, splits, and shivers; and from the mutual friction of the sapless trees spontaneous combustion sometimes takes place in the jungles.

ARCTIC, a. *ârk'tik* [L. *arcticus*: Gr. *arktikos*, near the bear, northern—from Gr. *arktos*, a bear, a cluster of stars in the north heavens called the Bear: F. *arctique*, northern]: pertaining to the north; northern; very cold. ARCTIC REGIONS, the lands surrounding the north pole. ARCTIC CIRCLE, an imaginary line passing round the north pole at a distance from it equal to the obliquity of the ecliptic, or  $23\frac{1}{2}^{\circ}$ . The corresponding circle round the south pole is the *Antarctic* circle. Within each of these circles there is a period of the year when the sun does not set, and another when he is never seen, this period being longer the nearer to the pole. ARCTIC CURRENT, an ocean-current which originates in the n. polar regions, and flows southward to the equator. ARCTIC SEA, the sea lying around the n. pole.

ARCTIC HIGHLANDS: name sometimes applied, not very appropriately, to that portion of the American continent between Hudson's Bay and the mouth of the Mackenzie. It has been the scene of all, or nearly all, the overland efforts in connection with the exploration of a Northwest Passage, from Hearne's discovery of the Coppermine down to the recent voyage of Anderson—the most prominent among the intermediate laborers having been Franklin, Richardson, Back, Dease, Simpson, and Rae.

## ARCTIC OCEAN.

**ARCTIC OCEAN:** that part of the universal sea which surrounds the north pole. Its single boundary, that towards the south, naturally divides itself into four sections—the n. shores respectively of the two continents, and the n. limits respectively of the two intercontinental oceans.

The A. O. meets the Pacific at Behring Strait, about  $66^{\circ}$  of n. lat., so that here the A. O. overlaps the Arctic circle by about  $30'$ . On the side of the Atlantic the common border seems equally independent of arbitrary definition, for Scoresby Sound almost as definitely terminates the s. e. coast of Greenland as North Cape terminates the n. w. coast of Europe; so that, as both extremes are intersected by about the same parallel of  $71^{\circ}$ , the A. O. here falls short of the Arctic circle by about  $4\frac{1}{2}^{\circ}$ .

In the old world, the A. O., if we include its gulfs, stretches s. of the Arctic circle, in the White Sea, fully  $2^{\circ}$ ; while at Cape Severo, the most northerly point of Asia, lat.  $78^{\circ} 25' \text{ n.}$ , it falls short of the same by  $11^{\circ} 55'$ . Lastly, within the range of the new world, the A. O., in its strict acceptation, is everywhere forced back within the Arctic circle, about  $5^{\circ}$  at Point Barrow, about  $7\frac{1}{2}^{\circ}$  on Barrow's Strait, and about  $3^{\circ}$  at the Strait of the Fury and Hecla.

The waters of the A. O., however, may conveniently be considered to extend beyond these their strict limits. So far as the mere aspect of the map is concerned, Davis's Strait, Baffin's Bay and Hudson's Bay may be regarded as gulfs rather of the Atlantic than of the A. O. But if essential characteristics are permitted to outweigh mere position, they must be assigned rather to the A. O. than to the Atlantic. Besides being all fed by currents from the A. O., they are all hyperborean in temperature. Even the most southerly of the three illustrates this. While Hudson's Straits present, in general, more ice than Davis's Strait or Baffin's Bay, Hudson's Bay itself has been the scene of perhaps the two most abortive, if not most disastrous, of all modern attempts at northern discovery. On opposite sides of Southampton Island, Lyons and Back were arrested by impenetrable packs, the one near the Bay of God's Mercy, and the other off Cape Comfort—the latter point being  $1\frac{1}{2}^{\circ}$ , and the former being twice as much, s. of the Arctic circle. Reckoning, therefore, to the bottom of James's Bay, as an arm of Hudson's, the arctic seas, thus appended to the A. O. proper, reach as far s. as the parallel of London.

Little as is yet known, at least accurately, of the A. O., its discovery and exploration have developed and tasked more skill and heroism than perhaps the exploration and discovery of all the rest of the world since the age of Columbus. Without anticipating what is to be said on this subject under the titles of **NORTHEAST PASSAGE**, **NORTHWEST PASSAGE**, and **POLAR EXPEDITIONS**, here may be stated summarily the comparatively easy labors of the Russians while issuing, as it were, from their domestic rivers to survey their domestic shores. About a century and a quarter ago, the Muscovites simultaneously sent forth five expeditions to complete, if possible, the Northeast Passage. From the White Sea to the Obi, four seasons were consumed; from the Obi



## ARCTIC OCEAN.

to the Yenisei, four seasons; from the Yenisei to the Lena, season after season was spent in both directions without success; from the Lena to the Kolyma, six seasons were occupied; from the Kolyma to the Pacific every effort was fruitless, though the Cossack Deshneff was known to have accomplished this part of the enterprise about a century before.

Arctic navigation is beset by almost every imaginable difficulty and danger. In addition to the peculiar perils of ice in all possible states, the adventurer, often blinded by fogs and snows, has to face, generally without guide or sea-room, the storms, tides, and currents of comparatively unknown waters. If such be his three months of summer, what must be his nine months of winter! On the parallel of  $73^{\circ}$ , and under a temperature of  $15^{\circ}$  below zero Fahr., Capt. McClure spent the night of 1851, Oct. 30, on the ice, amid prowling bears, and that without food or ammunition—his only guide being a pocket-compass, useless in the dark.

A combined series of expeditions were sent forth in 1882 by the various European countries and the United States, to spend the winter in a high latitude and make careful observations in terrestrial magnetism and meteorology, as well as in geography and other branches of science. Nine stations were equipped so as to form a kind of ring round the north pole, and during the winter 1882–83, valuable observations were recorded at the stations in Jan-Mayen, Lapland, Spitzbergen, Nova Zembla, Sagastyr Island (mouth of Lena), Point Barrow, Great Slave Lake, Lady Franklin Bay, and Cumberland Sound.

Notwithstanding the labors and researches of two centuries and a half, very little of this vast ocean has been even seen by man. To the n. of  $83^{\circ} 30'$ , in fact, the A.O., so far as authentic evidence goes, is a mere blank to geographers; for Parry, 1827, barely reached lat.  $82^{\circ} 45'$ ; Kane, in 1854, touched only  $81^{\circ} 22'$ ; the *Polaris*, in 1871, reached only  $82^{\circ} 16'$ ; in 1874, the Austro-Hungarian Polar Expedition just reached  $82^{\circ} 5'$ ; and the British Expedition of 1875–76 could advance no further than  $83^{\circ} 20'$ , the highest latitude ever attained. At all the intermediate points of longitude, the northern limit of geographical knowledge falls short, more or less at every point, of the parallel of  $83^{\circ}$ . Perhaps the actual average of such northern limit, even on the full tale of  $360^{\circ}$  of long., may not exceed lat.  $75^{\circ}$ , so as to leave absolutely unknown a circle of  $30^{\circ}$  of lat., or nearly 2,100 m. in diameter—an area little inferior to that of Europe. This untrodden world, however, is not to be regarded as a continuous wilderness of ice. Parry, at his furthest point, found not an unbroken field, but separate floes, with more or less of open water between them—the mildness of the temperature being indicated by falls of rain; and Kane, again, at his furthest point, saw a free sea to the north, as far as the eye could reach, from a promontory 240 ft. high; while, to use his own words, 'a gale from the n.e., of 54 hours in duration, brought a heavy swell from that quarter without disclosing any drift or other ice.' This is quite in keeping with the fact already noticed, that Hudson's Straits and Bay are often more en-

## ARCTIC OCEAN.

cumbered with pack than the waters of far higher latitudes. With regard to currents, Parry, during nearly the whole of his boat-sleigh expedition of 1827, found that his place by reckoning was considerably ahead of his place by observation, or, in other words, that his northward progress on the floes was neutralized more or less by the southward progress of the floes themselves, the existence of a current towards the south being thus shown. McClure derived advantage from the current whether advancing through open water or drifting along at the mercy of the pack. The experience of Weyprecht and Payer was different from that of any preceding navigators, since they found that they steadily drifted *north*. While McClure had the fortune to return with the news of the discovery of the Northwest Passage, McClintock has shown that the discovery must have been anticipated by Sir John Franklin. Succeeding expeditions, of which a great number have been equipped by England, Germany, France, Sweden, the United States, Austria, and Denmark, have been directed mainly towards the north pole. The reports of the expedition of 1875-76 led to the conclusion that the pole is surrounded by an inaccessible region of ice, to which has been given the name of the Palæocrystic Sea, or Sea of Ancient Ice. The Northeast Passage was accomplished for the first time by Professor Nordenskiöld in 1878-79; and repeated successful voyages have been made with cargoes between Western Europe and the mouths of the Obi and Yenisei, by way of the Kara Sea.

The only section of the southern A. O. that is moderately well known to a distance from the continent is that which washes the n.e. of America. It contains, under the collective name of Polar archipelago, many large islands. Off the coast of the old world are Spitzbergen, Nova Zembla, New Siberia, Wrangel Land, King Charles Land, etc. The latest discovery, made by Weyprecht and Payer, 1873, is that of Franz Joseph Land, an extensive and mountainous tract, lying about 200 m. due n. of Nova Zembla. Its s. coast is in about 80° n. lat., and it was seen to extend as far n. as 83°, occupying at least 15 degrees of longitude. The chief straits are Lancaster Sound, Barrow's Strait, Smith's Sound, Strait of the Fury and Hecla, Wellington Channel, Banks Strait, etc. The chief rivers, all of them on the mainland, are the Obi, the Yenisei, and the Lena, of the first class; the Mackenzie, the Yana, the Indigirka, and the Kolyma, of the second; and many others of the third.

The principal commercial production of the A. O. has been the whale. The whale fisheries on the w. of Spitzbergen, and on both sides of Greenland, scarcely need be mentioned. But it may not be generally known that, according to official returns quoted by Admiral Beechey, the Americans had in two years drawn more than \$8,000,000 from the whale-fishery at Behring Strait alone.

On the side of East Siberia, however, the A. O. produces a more remarkable article of traffic. Here are found, in the greatest abundance, the bones of the mammoth. Spring after spring, the alluvial banks of the lakes and rivers, crumbling under the thaw, give up, as it were, their dead:



## ARCTOGALIDÆ—ARCUS SENILIS.

while the islands lying off the Yana teem with these memorials of antiquity. (See Nordenskiöld's *Voyage of the Vega*, 1882.)

The American half of the A. O., if it cannot boast of fossil ivory, presents something still more difficult to be explained. In lat. 74° 25', and lat. 76° 15' respectively, Captain McClure and Lieutenant Meham discovered large deposits of trees, apparently indigenous, of considerable size. Writing of Banks' Island, McClure has the following passages: 'From the summit of these hills, which are 300 ft. high, to their base, abundance of wood is to be found, and in many places layers of trees are visible, some protruding 12 or 14 ft., and so firm that several people may jump on them without their breaking; the largest trunk yet found measured 1 ft. 7 in. in diameter'—equivalent in girth to about 5 ft. Again, 'I entered a ravine some miles inland, and found the n. side of it, for a depth of 40 ft., composed of one mass of wood. Some of it was petrified, the remainder very rotten, and worthless even for burning.' Writing of Prince Patrick Island, Meham has the following passage: 'Discovered buried in the e. bank of the ravine, and protruding about 8 ft., a tree of considerable size. During the afternoon I found several others of a similar kind; circumference of first and second tree seen, 3 ft.; of another, 2 ft. 10 in. From the perfect state of the bark, and the distance of the trees from the sea, there can be but little doubt that they grew originally in this country.'

ARCTOGALIDÆ, *âr-k-tô-gâl'î-dê* [Gr. *arktos*, a bear; *galê*, a weasel]: family of carnivorous Mammalia, containing the skunks (*Mephites*) and some allied animals.

ARCTOMYS, *âr-k-tô-mîs* [Gr. *arktos*, a bear: L. *mus*, a mouse]: the Mammalian genus to which the Marmots belong. It is placed under the *Rodentia*. They have pointed cheek-teeth. There are several species, the *A. marmotta*, or Marmot, living in the mountains of Europe and Asia, the *A. bobac* of Poland and n. Russia, the *M. citillus*, the Zizel or Souslik, and several from America. See MARMOT. *A. monax* is the common woodchuck.

ARC'TUM: see BURDOCK.

ARCTURUS, n. *âr-k-tû'rûs* [Gr. *arktos*, a bear; *oura*, a tail]: a fixed star of the first magnitude, in the constellation Boötis, which is situated behind the tail of the Great Bear.

ARCUATION, n. *âr'kû-â'shûn* [L. *arcus*, a bow]: the act of bending; crookedness; in *gardening*, the method of propagating certain trees by bending down to the ground the branches which spring from the offsets or shoots after they have been planted. ARCUATE, a. *âr'kû-ât*, bent in the form of a bow.

ARCUS SENILIS, *âr'k'ûs sên-î'lîs*: a not very well chosen term for change occurring in the cornea of the eye, in consequence of fatty degeneration of its marginal part. The term is objectionable, because the change usually

commences before the advent of old age, and, further, because the *arcus*, or arch, is usually converted into a complete circle by the time that the patient has reached the age of sixty or seventy years. The *arcus senilis* usually commences at or even before the age of forty years, as an opaque whitish crescent, skirting either the upper or lower margin of the cornea; and from this commencement it extends along the edge, till it finally becomes a complete circle, which sometimes assumes a chalky whiteness, and gives to the eye a very peculiar appearance. On careful examination, it may be seen that a narrow interval of partially clear cornea always intervenes between the arcus and the opaque sclerotic. As far as the eye is concerned, the formation of this circle is of little importance, but it is of great diagnostic value to the physician if, as Mr. Canton and several late observers maintain, its presence indicates the co-existence of fatty degeneration of the heart.

ARD, *árd*, or AIRD: a Celtic root, meaning 'height' (cf. Lat. *arduus*, high), which appears in many geographical names, especially in Ireland and Scotland.

ARDAHAN, *ar-dâ-hân'*: village of about 300 houses in the portion of Turkish Armenia ceded in 1878 to Russia; 35 m. n.w. of Kars. Its position gives it strategic importance. Its fortress was dismantled by the Russians in the war of 1854-56; in 1878, the Berlin Congress sanctioned the cession to Russia of A., which had been captured early in the war. On account of the severity of the climate, the houses of A. are mainly underground constructions.

ARDASSINE, n. *âr-dâs'sîn* [Fr. *ardassine*: Ar. and Per. *ardan*, a kind of raw silk]: the finest kind of Persian silk used in the French looms.

ARD'EA: see HERON.

ARDEB, n. *âr'dëb* [Ar. *irdab* or *urdab*]: measure of grain containing almost eight bushels, used in the parts of Africa where the Arabs most abound.

ARDECHE, *âr-dâsh'*: dept. in the s. of France, taking its name from the river A., a tributary of the Rhone; includes the most northern part of ancient Languedoc. Greatest length from n. to s., 74 m.; greatest breadth, 44; 2,130 sq. m. A. is almost wholly mountainous. In the n.w. of the dept., the Cevennes culminate in the volcanic Mont-Mezène, 5,972 ft. in height. The variety of the numerous extinct volcanic peaks, deep craters, rugged valleys, masses of tufa, grottoes, rock-labyrinths, ranges of basaltic columns, gigantic dams, etc., give an extraordinarily picturesque scenery. The upland, which has winter for six or eight months, is devoted to pasturage; but the terraces and valleys near the Rhone have a warmer climate, and produce good wine (white and red), olives, figs, almonds, chestnuts, etc. There are manufactures of silk, paper, leather, iron, etc., and good roads, with water-carriage, facilitate commerce. Lead, iron, copper, manganese, etc., are wrought. The chief towns are Privas, Aubenas, Bourg, St. Andréol. Pop. (1891) 371,269; (1901) 353,564.



## ARDEE—ARDENNES.

**ARDEE'**: town in the w. of Louth county, Ireland, on the river Dee, 12 m. inland. It contains two ancient castles—one built about 1200, now used as the town-house; the other a square building, now used as a prison. The chief trade is in corn and other agricultural products. Pop. (1894) 2,972.

**ARDEIDÆ**, *âr-dē'î-dē*: family of grallatorial or wading birds. They have large, long, and strong beaks and powerful wings, yet their flight is slow. They are migratory, frequenting the margins of lakes in various countries, or of the ocean, and are known as herons, bitterns, etc.

**ARDENCY**, n. *âr'dên-sî* [L. *ardens* or *arden'tem*, burning; OF. *ardant*, burning]: a state of burning; warmth of passion; zeal; eagerness. **AR'DENT**, a. 'burning; eager; zealous. **AR'DENTLY**, ad. -*li*. **ARDOR**, n. *âr'dér* [F. *ardeur*—from L. *ardor*, burning]: heat; warmth; fervency; affection. **ARDENT SPIRITS**, distilled spirits—so named from their hot, burning qualities.

**ARDENNES**, *âr-dên'*: the w. division of the slate-plateau of the Lower Rhine. It extends over portions of Belgium, France, and Rhenish Prussia, and consists of a broken mass of hills, for the most part of no great elevation, which gradually slope towards the plains of Flanders. In early times, the name was given to the whole of the region lying between the Rhine and the Sambre, a length of about 160 m. The average height of the hills is less than 2,000 ft.; but in the e. Mont St. Hubert attains an elevation of 2,300 ft. Large tracts of this region consist not of hills, but of gently undulating plateaus densely covered with oak and beech forests, while other portions are marshy, heathy, and barren. The districts through which the Meuse and other rivers flow present some extraordinary appearances. The channel of the river is sometimes bound in by rugged and precipitous cliffs more than 600 ft. high. The principal rocks of the A. are clay-slate, grauwacke, quartz, etc., interspersed with extensive strata of primitive limestone. Coal and iron mines are wrought in the n.w.; lead, antimony, and manganese also are found. There is little cultivation of grain, but multitudes of cattle and sheep are reared.

**ARDENNES**: a frontier dept. in the n. of France, bordering upon the provs. of Namur and Luxembourg in Belgium. It formed a part of the old prov. of Champagne. Length, from n. to s., 63 m.; breadth, from e. to w., 60; area, 2,020 sq. m. The n.e. of A. belongs to the basin of the Meuse; the s.w. is watered by the Aisne; both of these rivers are enriched with affluents, and united by the *Canal of A.* About one eighth of the whole surface is hilly, and covered with forests and wide tracts of pasturage. In the n. extremity of the dept., near Givet, marble is obtained; but the prevailing rock is limestone, veined with lead and iron. South of this, and stretching across the dept. from e. to w., are great layers of slate, with here and there flint, quartz, etc. In the s.e., muschelkalk, rich in iron-ore, abounds; and in the s.w., the soil is composed of arid chalk,

## ARDNAMURCHAN POINT—ARDUOUS.

a naked, treeless, elevated plain. Only the valleys are fertile, and produce corn. The vine is cultivated only at Mézières, in the southwest. Slate, marble, and iron, and porcelain-clay and sand for making glass are obtained. Excellent work-horses and sheep are reared. There are manufactures of earthenware, glass, marble, woolen cloths, metallic wares, etc. The principal towns are Mézières, Rethel, Rocroy, Vouziers, and Sedan, where Napoleon III. surrendered to the Prussians, 1870, Sept. 2. Pop. (1901) 315,539.

**ARDNAMURCHAN POINT**, *árd-nă-mér'kăn*: the n.w. promontory of Argyleshire, and the extreme w. point of the mainland of Britain. A light-house was erected here in 1849, visible at a distance of 20 miles. For 10 m. around, the country consists of trap, resting on sandstone often hardened, and blue slates. The trap veins form many striking reticulations in the strata. South of the point are found numerous oolitic and lias fossils.

**ARDOCH**, *ar'dok*: small village in Scotland, county of Perth, 8 m. s.s.w. of Crieff, celebrated for a Roman camp, the nearest entire now in Britain. The camp is  $2\frac{1}{2}$  m. n. of the Greenloaning station of the Caledonian railway, in the grounds of A. House. The intrenched works form a rectangle, 500 by 430 ft., the four sides facing the cardinal points. The n. and e. sides are protected by five ditches and six ramparts, these works being 270 ft. broad on the n. side, and 180 on the east. A deep morass is on the s.e., and the perpendicular banks of the Knaig Water, rising 50 ft. high, protect the camp on the west. The prætorium, or general's quarter, now called Chapel Hill, rises above the level of the camp, but is not exactly in the centre, and is nearly a sq. of 60 ft. each side. Three of the four gates usual in Roman camps are still seen. A subterranean passage is said to have formerly extended from the prætorium under the bed of the Knaig. Not far n. of this station, on the way to Crieff, may be traced three temporary Roman camps of different sizes. Portions of the ramparts of these camps still exist. A mile w. of A., an immense cairn of stones lately existed, 182 ft. long, 45 ft. broad at the base, and 30 ft. in sloping height. A human skeleton, 7 ft. long, in a stone coffin, was found in it.

**ARDOYE**, *ár-dwá'*: t. of Belgium, prov. of W. Flanders, 17 m. s. from Bruges. Pop. 6,500.

**ARDROSSAN**, *ár-drös'săn*: small seaport and summer bathing-place in Ayrshire. Its harbor, sheltered by an island, is one of the safest and most accessible on the w. coast of Scotland, and has been greatly improved, at vast expense, by the earls of Eglintoun. There is a large export of coal from this place, and ship-building is carried on. On a hill above the town stand the ruins of A. Castle, said to have been surprised by Wallace when held by the forces of Edward I. Wallace destroyed the garrison, and threw the dead bodies into a dungeon called 'Wallace's Larder.' Pop. (1894) 5,209.

**ARDUOUS**, a. *ár'dū-űs* [L. *ar'duus*, steep, inaccessible]:



## ARE—ARECA.

of difficult attainment; attended with great labor. **AR'**  
DUOUSLY, ad. -ūs-lī. **ARDUOUSNESS**, n. ā'r'dū-ūs-nēs.

**ARE**, v. ā'r [Dan. *ere*: Sw. *ære*: Icel. *eru*, *are*: Sw. *vara*: Dan. *vaere*, to be, to exist]: part of the verb *be*.  
**ARE NOT**, do not exist.

**ARE**, n. *air* [L. *ārēā*, an open place]: the unit of the French land-measure, a square, the side of which is 10 metres (or 32,809 ft.) long (see **METRE**), and which, therefore, contains 100 sq. metres = 1,076 English sq. ft. The next denomination in the ascending scale is the *decare*, containing 10 ares; but the denomination commonly used in describing a quantity of land is the *hectare* of 100 ares, = 2.47 English statute or imperial acres.

**AREA**, n; ā'rē-ā [L.]: any inclosed or open space; an open space in front of or around a sunk flat or floor of a building. As a term of *math.*, it means *quantity of surface*. The calculation of areas, or mensuration of surfaces, is one of the ultimate objects of geometry. The measuring unit is a square inch, a square foot, etc., according to the unit of length. As a figure is thus measured by finding an equivalent for its surface in *squares*, the process is sometimes called the *quadrature* of the figure.

**AREAD**, **AREED**, or **AREDE**, v. ā-rēd' [AS. *aræd*, counsel; *arædian*, to read; *ræden*, to interpret, to read: Goth. *redan*, to counsel, to provide]: in *OE.*, to advise; to declare; to show; to read.

**ARECA**, n. ā-rē'kā: a genus of palms containing several species, having pinnate leaves and double spathes. The fruit is a fibrous one-seeded drupe, a nut with an outer fibrous husk. *A. Catechu*, the **PINANG PALM**, or **Betel-nut Palm**, is a native of the East Indies, whose nut yields a sort of catechu. See **CATECHU**. This *Areca-nut* or *Betel-nut* is very much used in all parts of the East, the chewing of it with quick-lime and the leaf of the betel-pepper being one of the most prevalent habits of the people. See **BETEL**. The nut is about the size of a hen's egg; the fibrous husk about half an inch thick. It is austere and astringent. It is doubtful if it possesses a narcotic power, or if this is to be ascribed entirely to the leaf which is used with it. *Areca-nuts* are a considerable article of trade in the East. The timber of the palm which produces them, and its leaf-stalks and spathes are also used for domestic purposes. The tree is often 40 or 50 ft. high, and in general less than a foot in diameter. The leaves are few, but very large, their leaflets more than a yard long. In Malabar, an inebriating lozenge is prepared from the sap.—*A. oleracea*, the **CABBAGE PALM** of the West Indies, is a very tall tree, 100–200 ft., whose huge terminal leaf-bud is sweet and nutritious, and is sometimes used for the table as cabbage, but when it is cut off the tree is destroyed. The stem of this tree, notwithstanding its great height, is remarkably slender. The nuts are produced in great numbers; they are about the size of a filbert, and have a sweet kernel.—*A. sapida*, the **New Zealand Palm**, is remarkable as extending southward beyond the geographical limits of any other of its order, as far indeed

## ARECIBO—ARENARIA.

as lat.  $38^{\circ} 22'$  s. It is a small palm, only from 6 to 10 ft. high, with leaves 4–6 ft. long. The young inflorescence is eaten.—*A. vestiaria*, a native of the East, is so called because clothing is made from its fibres.

**ARECIBO:** a seaport of Porto Rico; on the n. coast; 50 miles w. of San Juan. The harbor is very poor, having neither natural nor artificial protection, and is, therefore, exposed to the full force of the ocean. Imports and exports are handled only by twice lightering. The town is built around a plaza from which streets run at right angles. Pop. (1899) 8,008.

**ARENA**, n. *â-rĕ'nă* [L. *arĕna*, sand]: a part of an amphitheatre (so called because it was usually strewed with sand, though when a fit of extravagance seized the Roman emperors they used borax and cinnabar instead), where the combats of gladiators and wild beasts took place. It had four main entrances, and was surrounded by a wall about 15 ft. high, so that the spectators were perfectly safe. The name was afterwards applied by the Romans to any building for exhibitions of baiting animals, horsemanship, etc. On the continent of Europe the name has been given to large summer theatres for dramatic performances in the open air. It is applied also, in a general sense, to any scene of contest or display of power.

**ARENACEOUS**, a. *ăr'-ĕ-nă'shŭs*: composed of grains or particles of sand; having the properties of sand.

**ARENA'CEOUS ROCKS:** rocks composed entirely, or to a large extent, of grains of silex. Beds of loose sand occur extensively in the more recent deposits. The grains, either of quartz or flint, are generally water-worn and rounded. In older deposits, the grains of sand are bound together by silicious, calcareous, argillaceous, or ferruginous cements. It is seldom that a rock is composed of quartz materials alone; grains or particles of other mineral substances are frequently mingled with the grains of quartz. Silvery flakes of mica are seldom absent; and they often occur in layers parallel to the planes of stratification, causing the rock to split into thin slabs, and exposing a glittering surface. These are called *micaceous sandstones*. When grains of feldspar occur, it is a *feldspathic sandstone*. Often large quantities of calcareous matter, either as cement or as distinct grains, occur; and these are called *calcareous sandstones*. The presence of lime can always be detected by the effervescence which takes place on the application of muriatic or other acid. When the sandstone is coarse-grained, it is usually called *grit*. If the grains are large enough to be called pebbles, it becomes *conglomerate* or *puddingstone*; if the fragments are sharp and angular, it is called *breccia*.

**ARENARIA**, *ăr-ĕ-nă'rĭ-ă*, or **SANDWORT**: genus of plants of the natural order *Caryophyllæ*, differing from *Stellaria* (Stitchwort, q.v.) chiefly in the undivided petals. The species are numerous, annual and perennial herbaceous plants of humble growth, rarely somewhat shrubby, natives of the temperate and colder parts of the world. Some are arctic and alpine plants. Many are found chiefly in sandy



## ARENATION—AREOLA.

soils. The flowers are generally small and inconspicuous, but, if closely examined, are seen to possess no little beauty.

**ARENATION**, n. *är-ē-nā'shūn* [L. *arenatio*, from *arenare*, to sprinkle with sand]: in *med.*, a sand-bath; sprinkling hot sand upon the body

**ARENDAL**, *á'rén-dál'*: town on the s.e. coast of Norway, near the mouth of the Nid-elf in the bay of Christiania. It is built partly on piles, partly on rock, and this with its situation gives it a very romantic aspect. The bay, protected by the island of Tromøe, forms an excellent harbor, and favors the commerce of the town, which is considerable, in proportion to its size. A. is intersected by canals; its exports are iron from the neighboring mines, and wooden articles. Ship-building is carried on; and on a smaller scale, distilleries and tobacco-factories. King Louis Philippe, after the French Revolution, when wandering in the north as Duke of Orleans, made some stay here. Pop. 4,000.

**ARENDALITE**, n. *ä-rén'däl-īt*. [In Ger., *arendalit*, from *Arendal*, near which it is found]: a mineral, a sub-variety of ordinary Epidote. It generally occurs in dark-green crystals.

**ARENDATOR**, n. *är'en-dā'tor* [L. L.]: in Livonia and other provinces of Russia, one who farms the rents or revenues; one who contracts with the crown for the rents of the farms.

**ARENG'**, or **ARENGA**. see **GOMUTO PALM**.

**ARENI'COLA**: see **ANNELIDA**.

**ARENICOLITES**, n. plu. *är'ě-nīk'ō-līts* [L. *arēna*, sand; *colo*, I inhabit; Gr. *lithos*, a stone]: a term used to designate those circular holes or markings which appear on the upper surface of many sandstones, having apparently been worm-burrows.

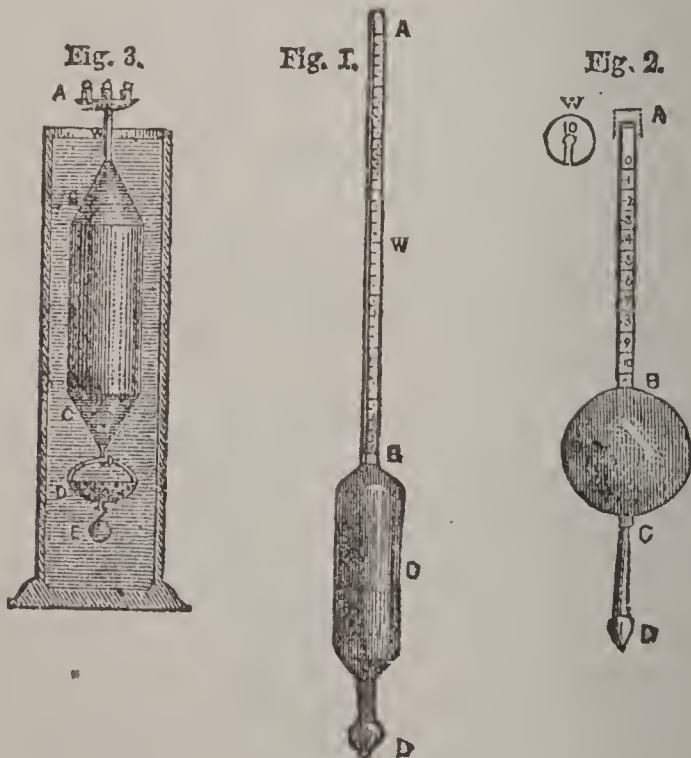
**ARENILITIC**, a. *ä-rén'ī-līt'īk* [L. *arēna*, sand; Gr. *lithos*, a stone]: of or like sandstone. **ARENOSE**, a. *är'ě-nōs*, or **ARENOUS**, a. *är'ě-nūs*, sandy. **ARENARIOUS**, a. *är'ě na'-rī-ūs*, sandy; composed wholly or in large part of sand. **ARENULOUS**, a. *ä-rén'ū-lūs*, full of sand; gritty.

**AREOLA**, n. *ä-r'ěō-lā* [L. *ärēōla*, a small open space, a small garden-bed: F. *aréole*]: the colored circle round the nipple or a pustule. **ARE'OLÆ**, n. plu. *-lē*, small interstices of cellular or other tissues; little spaces on the area or surface. **AREOLAR**, a. *ä-rē'ō-lēr*, of or like an areola. **AREOLATE**, a. *ä-rē'ō-lāt*, marked by areolæ, or little spaces or cavities. **ARE'OLA'TION**, n. *-shūn*, any small space distinctly bounded by something different in color, texture, etc. **AREOLAR TISSUE**, the tissue that loosely connects skin with muscle, and also forms a soft connective packing between muscles, around blood-vessels etc., and is composed mainly of interlaced 'white fibrous' and 'yellow elastic' tissues.

## AREOMETER.

**AREOMETER**, n. *ār'ĕ-ōm'ĕ-tēr* [Gr. *arai'os*, rare, thin; *metron*, a measure]: an instrument for measuring the specific gravity of liquids. **AR'EOM'ETRY**, n. *-trĭ*. **AR'EOMET'RICAL**, a. *-rĭ-kāl*, pertaining to.

**AREOMETER** [Fr. *aréomètre*, or *pèse-liqueur*: Ger. *Aräometer* or *Senkwage*], called also **HYDROMETER**: an instrument which is allowed to float freely in liquids, to determine their specific gravity or that of solid bodies. By specific gravity (q.v.) is meant the ratio that the weight of any volume of a substance bears to the weight of the same volume of water. Thus, a cubic foot of alcohol weighs 793 oz., while the same quantity of water weighs 1,000 oz.; the specific gravity of alcohol is set down, therefore, as  $\frac{793}{1000}$  or .793. A cubic foot of sulphuric acid weighs 1,841 oz., and has, consequently, a specific gravity of 1.841. These relations are not confined to the particular volume, one cubic foot, of these bodies, but hold for any equal volumes of them. Equal volumes of alcohol, water, and sulphuric acid have always to each other the ratio respectively of 793, 1,000, and 1,841; and this is only an instance of the general principle, that equal volumes of different substances have weights bearing to each other the direct ratio



Areometers.

of the specific gravities of these substances. This is the principle on which areometers with weights, or weight-areometers, are constructed. If, however, equal weights of any two of these liquids were taken, it would be found that .793 of a cubic foot of water would weigh as much as 1.000 cu. ft. of alcohol; 1.000 cu. ft. of sulphuric acid as much as 1.841 cu. ft. of water; or .793 cu. ft. of sulphuric acid as much as 1.841 cu. ft. of alcohol: more generally thus—when equal weights of two different fluids are taken, the



## AREOMETER.

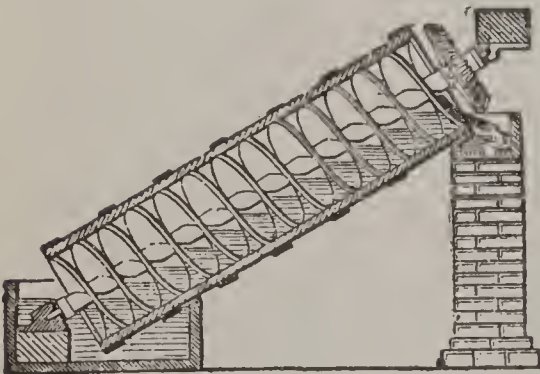
volumes of each are inversely as their specific gravities. On this latter principle depends the use of areometers with scales, or scale-areometers. The scale-A. is employed much more commonly than the weight-A., and is, in consequence, a much more important instrument. Of the various forms of scale-areometers, that contrived by Gay-Lussac deserves particular notice, from the simplicity of the mode of graduation; and an account of it will give the best idea of the general nature of such instruments. See Fig. 1. It consists of a uniform glass tube, AB, blown into two bulbs, C and D, at the bottom. The lower bulb, D, is loaded with mercury, so that when the instrument floats in any liquid the stem, AB, is maintained in a vertical position. Suppose that the quantity of mercury is so adjusted that when placed in water the A. sinks to the point W, which may in consequence be called the water-point. According to the principle of Archimedes, the weight of the volume of water displaced by the instrument up to this point is equal to the weight of the instrument. Suppose, for the sake of simplicity, that the water so displaced is a cubic inch, the weight of the A. will be that of a cubic inch of water, or 250 grs. (more correctly 252·5 grs. at 60° F.). If the A. be now placed in a fluid heavier than water, such as a mixture of sulphuric acid and water having a specific gravity  $\frac{5}{4}$  or 1·25, it is manifest that if it is sunk again to the water-point, the displaced fluid would weigh  $\frac{5}{4}$  of 250 = 312½ grs., or 62½ grs. more than the weight of the instrument. As much, therefore, of the stem of the A. must rise above the liquid as will reduce the weight of the displaced liquid to 250 grs., or reduce the volume to  $\frac{4}{5}$  of what it was before. If the stem in this case rises to B, the volume displaced by the part WB is  $\frac{1}{5}$  of the volume displaced by the instrument at the water-point. If the whole be divided into 100 parts, and the mark 100 be at W, B must be marked 80, as the A. displaces up to that point  $\frac{4}{5}$  of 100; and if the intervening space on the stem be divided into 20 equal parts, each of them will correspond with  $\frac{1}{100}$  of the water volume—viz., .01 of a cubic inch, or with  $\frac{1}{100}$  of the weight of the instrument—viz., 2·5 grs. If the same scale be carried above the point W., and the divisions marked as ascending from 100, the A. will be serviceable likewise for fluids less dense than water, and will mark the volumes which it displaces in each of them. The A. thus graduated gives immediately the volumes which it displaces in different liquids; and from these, seeing that it displaces in every case a weight of liquid equal to its own, the specific gravities may be calculated according to the principle already stated—viz., that equal weights of two different fluids have volumes inversely as their specific gravities. If, in a mixture of sulphuric acid and water, the A. stands at 90, according to the above principle 90 volumes of the mixture weigh as much as 100 of water; therefore its specific gravity is  $\frac{100}{90}$  or  $1\frac{1}{9}$ . Again, if in a mixture of spirits and water it should stand at 110, 110 volumes of the mixture weigh as much as 100 of water, so that its specific gravity is  $\frac{100}{110}$ , or  $\frac{10}{11}$ . In all cases, then, 100 is to be divided by the number read on



*Rocella tinctoria*, from which **Archil** is obtained.



Greek **Archimandrite**, from an original sketch.



**Archimedean Screw**.



**Argali** (*Caprovus Argali*).



**Argali Sheep**. Another specimen.



## AREOMETER.

the A., to determine the specific gravity of the liquid in which it floats.

The delicacy of the A. depends on the distance of the divisions on the scale, or on the thinness of the stem compared with the bulbs. An instrument possessing this advantage cannot be made to serve both for liquids heavier and lighter than water, for the stem would be of an inconvenient length; and it is usual to construct two areometers—one marked with the water-point at the top, and the scale descending to 50, for fluids heavier than water; and the other, with the water-point at the bottom, and the scale ascending to 150, for fluids lighter than water. The scale is generally marked on a slip of paper fixed inside the stem. Gay-Lussac's A. is known also under the name 'volumenometer.' Although it cannot be surpassed either for accuracy or simplicity, it is much less used than other instruments of a similar nature furnished with arbitrary scales, requiring the aid of tables to interpret the readings. The best known of these is Twaddle's A., used in England; and Beaumé's A., extensively adopted on the continent of Europe. The A. with an equally divided scale is a very ancient instrument; it was known among the Greeks under the name of 'baryllion.' On some areometers the divisions are not at equal distances, but are so drawn as to give at once, without table or calculation, the specific gravity of the fluid in which they are placed. Although very desirable, in practice they do not possess the accuracy of the A. with equally divided scales, because the graduation of them is attended with considerable difficulty.

No form of A. can be made to determine specific gravities with perfect accuracy, and such instruments are only useful where a ready and good approximation is all that is needed. They are, in consequence, employed chiefly to ascertain the specific gravity of the various liquors and solutions which occur in the arts and manufactures, and very frequently they are graduated with reference to special liquids, as spirits, wine, milk, brine, etc. The Alcohometer or Hydrometer of Sykes is an instrument of this latter description, and is used by excise officers for estimating the strength of spirits. It is represented in Fig. 2. BC is a hollow brass ball, surmounted by a flat stem, AB, and loaded below by a short conical stem, CD, terminated by the pear-shaped bulb, D. It is accompanied by eight weights, by which the weight of the instrument may be increased, and the range of the scale extended to fluids heavier as well as lighter than water. One of these weights, W, is shown in the figure; it is furnished with a slit, so as to allow of it being slipped on to the narrowest part, C, of the lower stem. The stem, AB, is graduated into 11 equal parts, and these again into halves; and the instrument is so adjusted that its indications give the volumes of water that must be added to or taken from 100 volumes of the mixture under examination to reduce it to proof spirit (see ALCOHOL), which is a mixture of nearly equal parts of water and alcohol. Thus, if the A. indicates 11 over proof, 11 volumes of water must be added in order to bring the liquid down to proof-

## AREOMETER.

strength; and 100 gallons of such strength would be reckoned as 111; 100 gallons, at 11 under-proof, would in the same way be charged as 89. Very carefully constructed tables accompany the instrument, in which the specific gravity and percentage of alcohol of different mixtures, at different temperatures, are marked, corresponding to each degree of the A. Since the specific gravity of alcohol is known, it might be thought that if that of a mixture of it with water were known, the relative proportions of each would also be known. This, however, is not the case, for alcohol and water possess a chemical affinity for each other, which causes the combined volumes of the two to measure less than the two volumes separately. Thus, 50 volumes of alcohol mixed with 50 volumes of water do not make 100 volumes of the mixture, but only 96, and thereby the specific gravity of the mixture is higher than it would have been if no contraction had taken place. As the law of this contraction is very complicated, the relative proportions of the two in a combination of given specific gravity are to be estimated only from tables founded upon experimental data.

The peculiar feature of areometers with weights is, that instead of a scale they have only one mark on the stem, to which the A. is in all cases sunk. One of the best-known instruments of this kind is the A. of Nicholson. It consists of a brass tube, BC (Fig. 3), abt. 1 inch in diameter, closed above and below by conical ends, to the upper of which a wire is fixed, carrying on the top of it a cup, A, capable of containing the weights; and to the lower a hook is attached, from which hangs the cup, D. The lower part of the cup, D, is also provided with a hook, and the whole instrument is kept vertical, partly by the weight of the cup, and partly by the weight of the ball, E, suspended from it. On the wire a notch, W, is made, to serve as the mark or fixed point to which the A. is sunk. The specific gravities of liquids are determined by Nicholson's A. in the following way: The weight of the A. itself is first ascertained—let it be in a given case 2,000 gr.—it is then put into water at the temperature 60° F., and weights (say 500 gr.) put in, till it is sunk to W. It is now removed to the liquid under examination; and if the weight required to sink the instrument now to the standard point be only 100 gr. we have the specific gravity of the liquid equal to  $\frac{2100}{2500}$  or  $\frac{21}{25}$ . In both fluids the same volume has been displaced, and that is in each case equal to the weight of the A; but the weight of the A. in the second case was 2,000 + 100, and in the former, 2,000 + 500; hence the above result. Nicholson's A. is seldom used for finding the specific gravity of fluids; its use is almost entirely restricted to ascertaining that of small solid substances, as gems and small pieces of minerals. The following example will show how this is done: If in the cup of the A. already mentioned, when placed in water, the gem be put, and only 440 gr. be then necessary to bring the instrument to W, 60 gr. is manifestly the weight of the gem, because 500 gr. were needed without it to do the same thing. The gem is next placed in the



## AREOPAGUS.

lower cup, D, and if 460 gr. are now needed to sink the A. to the standard point, the gem has thus lost 20 gr. of its weight by being immersed in the water. According to the principle of Archimedes (q.v.), these 20 gr. are also the weight of a volume of water equal to that of the gem; so the specific gravity of the gem is  $\frac{60}{20}$ , or 3. By reversing the cup, D, which is furnished with perforations to allow free passage to the air, and attaching the weight, E, to the handle of it, the specific gravity of substances lighter than water may also be determined by this instrument. The other forms of weight-areometers are those of Fahrenheit, Tralles, and Charles. For the more accurate determination of the specific gravities of liquids and solids, see SPECIFIC GRAVITY

AREOPAGUS, *ăr'ē-ōp'ă-gŭs* [L.—from Gr. *areĩ'os*, belonging to Mars: *Arēs*, Mars, and *pagos*, a hill]: a mount lying w. of the Acropolis, at Athens, and celebrated as the spot where the most venerable court of justice in ancient times held its sittings. AREOPAGITE, n. *ăr-ē-ōp'ă-jīt*: a member of the Areopagus.

It is not easy to determine satisfactorily why the Athenian hill obtained its name; probably it was on account of sacrifices having been offered there in early times to the God of War; but all its historie importance is derived from the Areopagitic Council, the origin of which reaches far back into antiquity, and is ascribed by some to the semi-mythological Cecrops. Orestes, according to tradition, was tried before this court, and it is certain that it must have existed long before the first Messenian war (B.C. 740), for the Messenians, in offering to submit to its decisions certain points of dispute, speak of it, even then, as 'old.' Solon, however, made many changes in its constitution, enlarging its sphere of jurisdiction to such an extent that it ceased to be any longer a mere criminal court, and acquired henceforth social and political powers in addition to the former. Before Solon's time it was strictly oligarchic. It now became a *tertium quid* between aristocracy and democracy, the new qualification for office introduced by Solon being *property* instead of *birth*. It thus naturally allied itself with aristocracy, so that we can perfectly understand why it should have been considered a check upon the impetuous democracy, though it would, perhaps, be fairer to regard it as a check upon both extremes. It is not known how many members were included in its council. The nine archons—if they had recommended themselves by a faithful discharge of their duties—were elected life-members of it. Solon made the council 'overseers of everything,' and we find instances of their manifold authority in the subsequent history of Greece. They granted money, at the time of the Persian invasion, from a reserve treasury of their own, the ordinary public treasury being empty. After the battle of Chæronea, they put to death all who had deserted their country. In social matters, their powers appear to have been curiously minute. They had officers whom they sent or accompanied into private houses, on occasion of a festivity, to see that the rooms were not overcrowded; they

## AREQUIPA—ARETÆUS.

called to account persons who lived in such riotous extravagance that their example might be considered hurtful to the community, and conferred marks of honor on those of an opposite character. Their sphere of influence seems to have extended to religion also. Innovations in the worship of the gods, neglect of the sacred ceremonies, impiety in any form, brought the offenders under the rebuke and punishment of the A. It is likewise asserted that they possessed and exercised great authority in the education of the young, although this statement, and that regarding some charitable functions attributed to them, are of dubious value.

Until the time of Pericles, the brilliant and powerful ruler of the democracy, the A. maintained its ancient dignity. He soon discovered, however, that unless shorn of its privileges it would prove an insurmountable obstacle to the realization of his designs. Against much vigorous opposition, he succeeded in carrying a decree (B.C. 458), by which, as Aristotle says, the A. was 'mutilated,' and democratic tribunals acquired supreme authority. It is, however, far from being clear what were the precise changes which Pericles effected, whether he abridged its powers as a criminal, or as a social and political, court. From the high estimation in which it was held for centuries after, in the first of these capacities, we are inclined to think that it was its social and political supremacy that was destroyed. Probably the A. was made responsible to the *demos*, or body of citizens. It lingered in life for a very long period. It is heard of as late as A.D. 380, and it seems from the case of the apostle Paul (Acts xvii. 19, 22), that it had in his day a certain authority in religious matters.

AREQUIPA, *á-rā-kē'pá*: term applied primarily to a mountain in the w. Cordillera of the Peruvian Andes, and secondarily to a city at its foot, being from this again extended to a district, a province, a department, and a diocese. 1. The city, lat. 16° 13' s., long. 72° 18' w., is the third largest in Peru, inferior only to Lima and Cuzco. It has considerable trade both with the interior and by sea. Its port is Islay, one of the larger harbors of the republic. Pop. of A. est. 35,000.—2. The department is bounded n. by Lima; e. by Ayacucho, Cuzco, and Puno; s. by Moquega, which, with it, forms the diocese; and w. by the Pacific. It is subdivided into seven provinces. Like nearly the whole of the maritime region of Peru, it is generally arid and sterile. Pop. 229,007.—3. The mountain is volcanic, of the form of a truncated cone, and of the height of 20,000 feet. Its neighborhood is subject to earthquakes.

ARÉS: see MARS.

ARETÆUS, *ār'ē-tē'ūs*: a famous physician of Cappadocia, who lived in the latter half of the 1st, and in the beginning of the 2d century after Christ. He is considered to rank next to Hippocrates in the skill with which he treated diseases; but he did not, in every instance, follow the practice of the 'Father of Medicine.' He was less attentive to 'the natural actions' of the system, which he frequently counteracted, if he thought desirable; adminis



## ARETHUSA—ARETINO.

tered active purgatives copiously, employed narcotics, and did not object to bleeding. He was noted for total want of professional bigotry; hence, not committing himself to any particular set of opinions, in his accuracy in the detail of symptoms and the diagnosis of disease he is superior to most of the ancient physicians. His great work, written in singularly elegant and concise Ionic Greek, is divided into two parts. The first four books treat of the causes and symptoms of acute and chronic diseases; the second, the cure of the same. They are in a state of almost complete preservation, and have been translated into various European languages, besides having been frequently edited in the original. There have been editions by Wigan (Oxford, 1723); Kuhn (Leipzig, 1828); and Ermerius (Utrecht, 1847). An English translation by Reynolds was pub. 1837.

ARETHU'SA: see ALPHEIUS. : ORCHIDACEÆ.

ARETINIAN SYLLABLES: the syllables *ut, re, mi, fa, sol, la*, used in music by Guido d'Arezzo for his system of hexachords.

ARETINO, GUIDO: see GUIDO ARETINO.

ARETINO, *â-râ-tê'no*.; PIE'TRO, Italian author: 1492, Mar. 20—1556; b. Arezzo, Tuscany; natural son of a gentleman named Luigi Bacci. Banished from his native town, he went to Perugia, where he wrought as a book-binder, and gathered up a few scraps of learning, until, seized with a desire of becoming famous, he abandoned his occupation, and wandered through Italy in the service of various noblemen. At Rome, he distinguished himself by his wit, impudence, and talents, and secured even the papal patronage, which, however, he subsequently lost by writing licentious sonnets. A. now went to the Medicean court, where John de' Medici grew so fond of him that he shared his bed with the adventurer, and even procured him an opportunity of ingratiating himself with Francis I. at Milan in 1524. A few years later, he settled at Venice, where also he acquired powerful friends. The Bishop of Vicenza not only soothed the irritation of the pope against A., but also recommended him to the emperor Charles V. The latter, as well as his chivalrous rival, Francis, and other great persons, pensioned the fortunate wit, besides enriching him with splendid presents. He likewise obtained considerable sums for his literary efforts.

Nature had undoubtedly gifted A. with some fine qualities, but these were vitiated by his love of sensual gratifications. His death accorded with the character of his life. It is said that while laughing heartily at some trifling adventure of one of his abandoned sisters, he fell from a stool, and was killed on the spot. His poetical works include five comedies and a tragedy. The former are full of wit and genuine comic humor; the latter is not without merit. His *Sonnetti Lussuriosi* have been translated into French under the title of *Académie des Dames*. Besides these, he wrote a number of other pieces, some of which have not been published. His satire procured for him

## ARETINO—AREZZO.

the name of 'the Seourge of Prinees,' but it seems clear that he was equally fitted to be their syeophant. Although the very impersonation of licentiousness, he had nevertheless the impudenee to publish some books of a devotional kind, with the view of obtaining the favor of the pope.

ARETINO, SPINELLO: 1316 (or 1328)–1408; b. Arezzo, Tuseany: early Italian painter of great genius. He studied under Jacopo del Casentino; but before he had attained his majority, he had surpassed his master in the vigor and liveliness both of his conceptions and coloring. His reputation attained its full bloom after he went to Florence, where he painted in fresco, in the chapel of St. Maria Maggiore, several incidents in the life of the Virgin and of San Antonio Abate. The monastery of San Miniato, near Florence, contains to the present day a few of his frescoes. He also adorned the monasteries of San Bernardo at Arezzo, and Monte Oliveto near Florence. Vasari thought that the finest works of A. were those which he executed for the Campo Santo at Pisa, illustrating the life of San Ranieri. Of these, however, we have only prints, and cannot therefore judge satisfactorily. His principal works, still remaining, are those from the life of Pope Alexander III. in the town hall of Siena.

Throughout all Italy, A. was greatly admired for his invention, the grace and simplicity with which he arranged his figures, and the finish of his style. His Madonnas had remarkable sweetness of expression; and his coloring was in most cases bold and beautiful. Vasari prefers him to Giotto.

AREZZO, *á-rét'so* (ARETIUM): chief city of the Italian province of A.; in a fertile valley near the confluence of the Chiana with the Arno, lat. 43° 27' n., long. 11° 52' e.; 38 m. e.s.e. from Florence. A. is perhaps the oldest town in Tuseany, and was one of the twelve cities of the ancient Etruscans. It was devastated by Sylla during the Social War; and, like many other Italian cities, was sacked by the Goths when they burst into the peninsula. During the contest of the Guelphs and Ghibellines, in a later age, it became subject to Florence, whose troops defeated those of A. at the battle of Camaldino, in which the poet Dante took part. The *Piazza Grande*, the *Piève*, an old church founded on the site of a heathen temple, and the cathedral, which, like almost all the other churches, has an unfinished façade, are its principal public buildings. The cathedral has a splendid high altar in marble by Giovanni Pisano; and the several churches contain fine specimens of the old Tusean school of painting. These ecclesiastical decorations are contrasted with the general aspect of the city, which has dark and dirty streets. Its industry is at present at a very low ebb, there being few or no manufactures, and its people are not generally favorites in Italy; but perhaps no city of its size ever produced a greater number of celebrated men, among whom may be mentioned—Mæenas, the famous patron of letters in the time of the emperor Augustus; Petrarck; Pietro Aretino; Guido de A., inventor of



## ARGAL—ARGAND.

the gamut; Leonardo de A., the historian; Cesalpino, the botanist; Redi, the physician; Pope Julius III.; the notorious Marshal d'Ancre; and Vasari, author of *Lives of the Painters*. Michael Angelo was also born in the vicinity of A. Its extensive walls and numerous churches bear record of its more flourishing and more populous period. Pop. (1901) 44,316. The province of A. contains 1,276 sq. m.; is fertile in corn, wine, and oil; pop. (1901) 271,676.

ARGAL, n. *är'gāl*, or AR'GOL, n. [said to be from Arabic: Gr. *argos*, white]: crude tartar, or impure cream of tartar. It is found as a crust in old wine casks. See ARGOL.

ARGAL, ad. *är'gāl* [a corruption of L. *ergo*]: in *O.E.*, slang for *ergo*, therefore.

AR'GALA: see ADJUTANT.

ARGALI, n. plu. *är'gǎ-lī* [native name]: the *Ovis ammon*, or gigantic wild sheep of Siberia and Central Asia. It is found from Kamtchatka to the Himalaya Mountains, where, however, it is seen in only the more elevated regions.



Head of the Argali Sheep.

'We came suddenly,' says Dr. Hooker in his *Himalayan Journal*, 'upon a flock of gigantic wild sheep, feeding on scanty tufts of dried sedge and grass; there were twenty-five of these enormous animals, of whose dimensions the term sheep gives no idea; they are very long-

legged, stand as high as a calf, and have immense horns, so large that the fox is said to take up his abode in their hollows when detached and bleaching on the barren mountains of Thibet.' The horns of the male are nearly 4 ft. long, and 14 in. in circumference at the base, where they are triangular. The general color is fulvous gray, white beneath, with a whitish disk around the tail. The wool is concealed by hair. The name A. is Mongolian, and was adopted by Pallas. A similar but smaller species also is found on the Himalaya Mountains. The Rocky Mountain Sheep, or Bighorn, is sometimes called the American A. See SHEEP.

ARGAN (*Argania sideroxylon*, *Sideroxylon spinosum* of Linnæus): a low spiny evergreen tree of the natural order *Sapotaceæ*, native of the southern parts of the kingdom of Morocco, bearing an ovate drupe about the size of a plum, dotted with white, and full of a white milky juice. The Moors extract an oil from the fruit, which they use with their food.

ARGAND, *är'gānd*, or *är-gōn'*, AIMÉ: b. Geneva, abt. the middle of the 18th c.; d. 1803, Oct. 24: physician and chemist. He was the inventor of the well-known *Argand lamp* (q.v.); and early becoming involved in a dispute with

## ARGAND LAMP—ARGEL.

one Langé of Paris regarding the originality of his invention, he went thither to vindicate his claim, but rather than risk the chances of a lawsuit he consented to share the honor, and a patent was obtained by which Langé and A. alone were authorized to make and sell the new lamps in France for 15 years. The French Revolution, however, destroyed their privilege, and A. retired to England. After some time, he returned to his native country, a victim to melancholy and fantastic humors, and died.

**ARGAND LAMP, or ARGAND BURNER:** a form of wick, or gas-burner, giving a circular flame. The chief difficulties that attended the use of lamps as a source of light were—first, in procuring the complete combustion of the oil, so as to keep the flame from smoking; and second, in preventing the level of the oil in the reservoir from sinking as the combustion goes on. The round cotton-wick, used in the old simple form of lamp, was always attended with smoke and smell. The oils and fats are exceedingly rich in carbon, containing 70 to 80 per cent. of that element, and only 10 to 12 of hydrogen. The round, thick column, then, of oil-vapor rising from the wick of an old-fashioned lamp, presented too little extent of surface to the air; the oxygen of all the air that could get access was chiefly taken



Argand Burner.

up in burning the hydrogen, and a large proportion of the carbon ascended in the burnt air as smoke. A.'s improvement was that he made the wick in the form of a ring. The flame thus became a hollow cylinder with a current of air ascending through the inside, so that the burning surface was doubled. It would appear, however, that the lamp did not satisfy the expectations of A., till his younger brother accidentally discovered the effect of a glass cylinder, as a chimney over the flame, by which the flame was steadied, a draught created, and the greatest possible amount of light yielded. The principle of the Argand Burner for gas is the same—increased combustion by means of an ascending column of air within.

**ARGAUN':** village in the territory of the Nizam; in lat.  $21^{\circ} 2' \text{ n.}$ , long.  $77^{\circ} 2' \text{ e.}$ ; on the route between Ellichpore and Aurungabad. Its single claim to notice is that, 1803, Nov. 28, about two months after the battle of Assaye; Maj.Gen. Wellesley here gained another victory over the Mahrattas. To commemorate this action, a medal was struck in 1851, about a year before the death of the illustrious conqueror.

**ARGEAN**, a. *âr-jě'ăn* [from *Argo*, the ship which carried Jason and his companions to Colchis in quest of the golden fleece]: pertaining to the *Argo* or the ark.

**ARGEL** or **ARGHEL**, *âr'gěl* (*Solenostemma A.*, or *Cynanchum A.*): plant of the natural order *Asclepiadaceæ*, native of Arabia and of the north of Africa, deserving notice only because of the frequent use of its leaves for the adulteration of senna. They are lanceolate and leathery, and may read-



ily be distinguished from genuine senna leaves by their texture, their being downy, their greater heaviness, the comparative absence of veins, and the symmetry of their sides, the sides of the true senna leaves being unequal. They are acrid, and cause sickness and griping, but opinions differ as to their possessing purgative properties.

ARGELANDER, *âr'gêh-lân-dêr*, FRIEDRICH WILHELM AUGUST: 1799, March 22—1875; b. Memel, Prussia: one of the most eminent astronomers of our time. He studied at Königsberg, where the science of finance first attracted him; but he was subsequently drawn to astronomy by the lectures of Bessel, by whom he was employed to make calculations and observations. In 1820, he was appointed assistant to Bessel in the Königsberg Observatory, and in 1823 succeeded Walbeck as astronomer at the observatory of Abo, in Finland. Here he commenced a series of observations on the fixed stars which have a perceptible 'proper motion.' His studies were unfortunately interrupted by a fire which destroyed the observatory; but after a time he resumed them in a new observatory at Helsingfors, and published a catalogue of not less than 560 stars having 'proper motions.' This contained the results of his observations at Abo, and received from the Academy of St. Petersburg the great Demidov prize. After removing to the University of Bonn in 1837, A. published his *Uranometria Nova* (Berlin, 1843), containing celestial charts of the fixed stars in our hemisphere seen with the naked eye; also (1846) his *Astronomical Observations*, containing the results of an examination of the northern heavens from 45° to 80° declination. His *Atlas of the Heavens* will combine with these works to perpetuate his memory. A. was long engaged in a series of observations on the changes of light in variable stars; he also demonstrated the theory that there is a progressive motion of the solar system in space.

ARGEMONE, *âr-jê-mô'nê*: genus of plants of the natural order *Papaveraceæ*, distinguished by 4–6 petals, 4–7 radiating concave stigmas, and an obovate capsule, opening by valves at the point. *A. Mexicana*, sometimes called Mexican poppy, is an annual herbaceous plant with large yellow flowers, and sessile, waved and sinuated, spiny leaves, variegated with white. It is a native of Mexico, introduced in southern parts of the United States, and is now common also in many tropical and sub-tropical countries, in which it has been naturalized. Its seeds are narcotic, purgative, and diuretic, exhibiting in a strong degree those qualities of the order of which the seeds of the poppy are devoid. They are used in the West Indies as a substitute for ipecacuanha, also instead of opium; and the juice of the plant is employed as a remedy for ophthalmia.

ARGENS, *âr-zhôn'*, JEAN BAPTISTE DE BOYER, MARQUIS D': 1704, June 24—1771, Jan 11; b. Aix, in Provence. He was originally intended for a learned career; but, from a love of adventure, he entered the army at fifteen. Fascinated by a certain actress, he eloped with her to Spain, but was captured and brought back to Provence. In spite of his glaring breach of discipline, he had the good fortune to be em-

## ARGENSOLA—ARGENSON.

ployed in the French embassy to Constantinople, and on his return re-entered the army. Being disabled by accidents in military service, and disinherited by his father, he tried his fortune in authorship, and by his *Lettres Juives*, *Lettres Chinoises*, *Lettres Cabalistiques*, and *La Philosophie du Bon Sens* (London, 1737), attracted the notice of Frederick II., then crown prince of Prussia, and became a favorite at the court when Frederick came to the throne. The king appointed him chamberlain, and a director of the Art Academy at Berlin, with a salary of 6,000 livres. He was a constant associate of Frederick, who liked exceedingly his frank and vivacious character, but used to tease him on account of his hypochondriacal fits. When almost a sexagenarian, he renewed the adventures of his youth by again falling a victim to the charms of an actress, Mademoiselle Cochois, whom he married without Frederick's permission. This and other circumstances irritated the despotic monarch, who deprived A. of his pension; and A. returned to Provence, and died at Toulon. His numerous writings, but especially his *Histoire de l'Esprit Humain*, *Lettres et Mémoires*, and those above mentioned, once had considerable reputation.

ARGENSOLA, *âr-hěn-so'lá*, LUPERCIO and BARTOLOMÉ LEONARDO DE: two of the first among the Spanish poets in the 'golden age,' were born at Barbastro, in Aragon; the former, 1565; the latter, 1566. They died, the former, 1613; the latter, 1631, Feb. 26. They studied at the University of Huesca. Lupercio afterwards went to Madrid, while Bartolomé entered the priesthood. In character, fortune, and career, however, they were closely united. Both were patronized by Maria of Austria, who appointed one her chaplain, and the other her private secretary. The latter was subsequently made chamberlain to the archduke Albert of Austria, and Philip III. appointed him historiographer of Aragon. Bartolomé was employed by the Count de Lemos to edit the *Conquista de las Molucas* (Madrid, 1609), and when this nobleman was appointed viceroy of Naples, both the brothers A., who had acquired fame as poets, attended his court at Naples, where Lupercio, who then filled the office of secretary of state, died. Bartolomé returned to Spain with the viceroy in 1616, and occupied the position formerly held by his brother as historiographer of the kingdom of Aragon, where he proceeded with the work left unfinished by Lupercio—a continuation of Zurita's *Annals of Aragon*. While engaged in this work he died. The collected poems of the two brothers were first pub., 1634, by the son of Lupercio, and passed through several editions. These poems (*Rimas*) consist of epistles, odes, sonnets, and satires, and are singularly alike in character. They are imitative of the style of the Latin poets (especially Horace, for which reason the brothers have been styled 'the Spanish Horaces'), and display more care and polish than originality of invention or richness of fancy. Bartolomé A. as a prose-writer is reckoned among the Spanish classics. The style of his continuation of Zurita is a great advance on the original; especially in correctness.

ARGENSON, *âr-zhôn-sôn'*, MARC PIERRE, COMTE D':



## ARGENT—ARGENTINE REPUBLIC.

1696–1764: celebrated French statesman. He succeeded M. de Breteuil as secretary of state to the war minister 1742. On the death of Cardinal Fleury, in the following year, the whole care of the war then raging devolved on him. He found affairs in a deplorable condition. The French troops were in full retreat across the Rhine; the Austrians already swarmed in Alsace and Lorraine, and the very political existence of France was imperilled; but A., by his vigor and lucky choice of generals, changed in one year the fortunes of the war. After the victories of Fontenoy and Lawfeldt, and the capture of Bergen-op-Zoom peace was secured by the famous treaty of Aix-la-Chapelle, signed 1748. He was an illustrious patron of literature.

ARGENT, n. *âr'jënt* [F. *argent*, silver—from L. *argentum*, silver; *ârgĕn'tĕŭs*, of the lustre of silver]: the white color in coats of arms: ADJ. silvery: bright. ARGENTINE, a. *âr'jĕn-tĭn*, like silver: N. a mineral. ARGENTAL, a. *âr-jĕn'tāl*, or ARGENTIC, a. *âr-jĕn'tĭk*, of or like silver. ARGENTAN, n. *âr'jĕn'tăn*, German silver. ARGENTATION, n, *âr'jĕn-tă'shŭn*, an overlaying with silver. ARGENTIFEROUS, a. *âr'jĕn-tĭf'ĕr-ŭs* [L. *fero*, I produce]: containing silver. ARGENTITE, n. *âr'jĕn-tĭt'*, sulphuret of silver, the most important and richest ore of silver, of a blackish lead-gray color.

ARGENTEUIL, *âr-zhŏn-tŭil'*: town of France, dept. of Seine et Oise. Its priory, now in ruins, was founded in the 7th c., and was by Charlemagne made a nunnery, of which the famous Heloïse became abbess. Pop. (1891) 13,339.

ARGEN'TEUS CODEX: see ULFILAS.

ARGENTINE, *âr'jĕn-tĭn* (*Argentina*): genus of small fishes of family *Salmonidæ* for the resplendent silvery lustre of their sides, and the abundance of *nacre* (q.v.) on their air-bladder. A. denotes also a silvery siliceous carbonate of lime: also white metal coated with silver.

ARGENTINE, *âr'jĕn-tĭn*: city in Wyandotte co., Kan., near the Kansas river; and on the Atchison Topeka and Santa Fé railroad, 5 m. from Kansas City, Mo. It is in an open farming country; has 1 state bank, and 1 weekly newspaper; and a number of furniture and other industries, including a large smelting and refining establishment. A. has electric light and water works. Pop. (1890) 4,732; (1900) 5,878.

ARGENTINE REPUBLIC: federal republic of S. America, taking its name from the river La Plata ('river of silver,' a misnomer); (see PLATA. RIO DE LA); lat. 22° 30'—56° s., long. at the widest part 54°—70° 31' w.: 1,125,086 sq. m.: bounded w. by the Andes, which separate the A. from Chile; n. by Bolivia; e. by Paraguay, Brazil, Uruguay, and the Atlantic: southward it extends to Cape Horn. Capital, Buenos Ayres. The islands of Fuegia, on the s., belong partly to it and partly to Chile. The area and pop. by the census of 1900, Dec. 31, were as follows:

# ARGENTINE REPUBLIC.

| PROVINCES.                   | Area:<br>Eng. sq. m. | Population.<br>1900. |
|------------------------------|----------------------|----------------------|
| Buenos Ayres (city).....     | 72                   | 821,291              |
| Buenos Ayres (province)..... | 117,777              | 1,140,067            |
| Santa Fe .....               | 50,916               | 536,236              |
| Entre Rios.....              | 28,784               | 343,684              |
| Corrientes.....              | 32,580               | 277,041              |
| Rioja ...                    | 34,546               | 77,783               |
| Catamarca .....              | 47,531               | 99,827               |
| San Juan .....               | 33,715               | 94,991               |
| Mendoza.....                 | 56,502               | 141,431              |
| Cordova ...                  | 62,160               | 419,072              |
| San Luis ..                  | 28,535               | 91,403               |
| Santiago del Estero .....    | 39,764               | 180,612              |
| Tucuman.....                 | 8,926                | 249,433              |
| Salta .....                  | 62,184               | 131,938              |
| Jujuy.....                   | 18,977               | 54,405               |
| Total Provinces.....         | 622,969              | 4,659,214            |
| <b>TERRITORIES.</b>          |                      |                      |
| Misiones.....                | 11,282               | 32,521               |
| Formosa .....                | 41,402               | 5,589                |
| Chaco .....                  | 52,741               | 12,197               |
| Pampa .....                  | 56,320               | 46,662               |
| Rio Negro.....               | 75,924               | 13,859               |
| Neuquen.....                 | 42,345               | 16,095               |
| Chubut.....                  | 93,427               | 4,409                |
| Santa Cruz.....              | 109,142              | 1,444                |
| Terra del Fuego.....         | 8,299                | 1,010                |
| Los Andes.....               | 21,989               | 1,149                |
| Total .....                  | 1,135,840            | 4,794,149            |

Except the most purely Indian districts to the w. of Buenos Ayres, the provinces of the A. R. lie chiefly in the basin of the Rio de La Plata, embracing much the larger half of the same. Mountains abound in the n.w.; and elevated ranges are found also in Entre Rios, which is situated, as its name implies, between the Parana and the Uruguay. But, with these exceptions, nearly the whole country presents boundless plains, covered alternately with rich pasturage and gigantic thistles. The climate and productions vary considerably—being tropical and temperate respectively to the n. and s. of Corrientes (in 27° 27' n. lat.). The chief agricultural products are wheat, maize, flax, and linseed; but principal exports are hides, wool, meat, etc. Agriculture is backward, less than one per cent. of the surface being under cultivation. The rearing of live-stock is the great business of the country. Millions of cattle wander at will across the plains, or are kept on breeding-estates of vast extent; and likewise of mules and horses there are immense bands. Besides the Rio de La Plata, which is rather an estuary than a river, and its far-reaching affluents, the hydrography of the A. R. comprises the head-waters of some southern streams, which fall into the open Atlantic, such as the Rio Colorado, the Rio Negro, etc.; and along the w. border under the shadow, as it were, of the Andes, salt-lakes are common. In connec-



## ARGENTINE REPUBLIC.

tion, doubtless, with this feature in the hydrography, mines of rock-salt exist, and salt here and there abundantly encrusts the plains, both to the satisfaction and to the benefit of the roaming herds. The names of the country and its estuary are, as already characterized, to a great extent misnomers, yet silver ore, gold, copper, sulphur, coal, and alum have been found near the Andes. Little mining has yet been done. The exports (1890) were as follows: wheat, tons 327,894; maize 707,281; flour 12,017; seeds 830; peanuts 289; potatoes 871; baled hay 19,120; barley 1,308; linseed 30,720. The export of frozen meats was: mutton, tons 20,413, value \$1,633,105. The canning of meats is an industry of very recent introduction, but has already reached considerable proportions. The export of hides, hair, horns, tallow, wool, etc. amounted to \$4,773,490; of live-stock there were exported: asses 6,793; horses 29,052; sheep 50,002; mules 11,755; horned cattle 150,003. The acreage of sugar plantations was 42,500 acres; product (1889) 35,000 tons of sugar, 8,155,424 litres alcohol. Of wines the exports (1890) were 10,685 litres. The imports were \$142,240,812; exports \$100,818,993.

The foreign trade of the A. R. 1901 (in gold dollars) was mainly with the following countries :

| COUNTRIES.         | Imports from    | Exports to      |
|--------------------|-----------------|-----------------|
|                    | <i>Dollars.</i> | <i>Dollars.</i> |
| Great Britain..... | 26,460,808      | 29,920,759      |
| France.....        | 9,959,541       | 28,637,121      |
| Germany.....       | 16,724,549      | 21,479,882      |
| Belgium.....       | 8,688,657       | 13,457,731      |
| United States..... | 15,533,639      | 9,296,454       |
| Italy.....         | 14,736,103      | 4,318,950       |
| Brazil.....        | 4,386,047       | 9,702,488       |

In 1901 the total revenue was £13,051,752, and the expenditure £14,074,362. The imports aggregated in value £22,795,000, and the exports £33,540,000. The foreign debt was £77,755,500, and the internal debt £13,602,230. All of the provincial debts have been assumed by the national government, which has issued 4½ per cent. bonds in exchange. The chief exports are wool, skins, and hides, live animals, mutton, tallow, bones, corn, and flax, and the imports are chiefly manufactured articles.

The following statement is from an unofficial but trustworthy source in Buenos Ayres: When Gen. Roca retired from power in 1886, the financial condition of the A. R. was as follows: Currency, \$70,000,000; debt \$117,200,000; revenue (gold) \$37,200,000: the value of the currency dollar was then 80 cents gold. In 1890, Aug.: currency \$200,000,000; debt, \$355,800,000; revenue (gold) \$29,200,000; value of the paper dollar, 40 cents gold. In 1891, Nov., the position was: currency \$300,000,000; debt \$475,000,000; revenue (gold) \$22,500,000: value of paper dollar 27½ cents gold.

There were in the A. R. (1901) 10,300 m. of railway and 276 m. of tramway (all in Buenos Ayres). The railways represented \$541,575,623 capital; gross receipts \$45,405,523;

## ARGENTINE REPUBLIC.

expenses, \$23,902,605. Some of the railroad companies hold a guarantee of the govt. to make their net income equal to 7 per cent. of their capital. The public expenditure on this account was (1890) \$14,693,280.

The state religion is Rôm. Cath., but all creeds are tolerated. In 1890 there were 5 theol. seminaries; 3,233 elementary schools, with 7,054 teachers and 260,695 pupils; 16 lyceums for secondary instruction, 450 teachers and 3,127 pupils; 2 universities, 1,007 students; 34 normal schools, with 12,154 students; and mining, agricultural, milit., and naval schools. Under the judicial system each province has its own courts, and there is a national supreme court of five judges and an atty.gen., who also constitute a court of appeals. In all criminal cases the constitution guarantees trial by jury. The executive authority is vested in a pres., elected for 6 years and ineligible for re-election; the legislative in a senate of 30 members, and a house of deputies of 86 members; and the provincial in govs. and legislatures elected by the people.—The army consists of about 7,400 men, besides the national guard of 350,000. The navy consists of 28 vessels—including three iron-clads and 4 torpedo-launches.

*History.*—In 1515, Juan Diaz da Solis, while searching for a passage into the Great South Sea newly seen by Balboa, entered the Rio de La Plata. In 1526, Sebastian Cabot, son of the discoverer of Newfoundland, penetrated nearly to the confluence of the Parana and the Paraguay, being arrested by the rapids, which afterward gave name to Corrientes. In 1535, Buenos Ayres was founded, to command, though indirectly, the most practical channel of the only outlet of the country, a city which, in conjunction with its own colony of Monte Video, on the opposite bank, has virtually monopolized the history of a region equal in extent to w. Europe. Gradually other cities were planted, partly by colonists from Spain, partly by adventurers from Peru. The chief staples of the country—horses and cattle—had been largely introduced before 1552. Until 1775, the basin of the Rio de La Plata was a dependency of the viceroyalty of Lima. In that year, however, was erected the viceroyalty of Buenos Ayres, which added Bolivia, under the name of Upper Peru, thus embracing the head-waters of the Amazon, and most of the plateau of Titicaca. The year 1806 ushered in a change. Spain, as ally of France, being then at war with England, Buenos Ayres and Monte Video were occupied by the English—a change which though brief, sowed the seeds of revolution by showing the colonists the weakness of their former masters, and moving them to assert their independence. The triumphant militia, after deposing and expelling the legitimate viceroy for cowardice, elected in his stead the French officer who had led them to victory. Napoleon's dethronement of the Bourbons, 1808, occasioned an outbreak throughout Spanish America, and from 1810 the A. R. was in confusion. In 1816, a general congress declared the independence of the 'United Provinces of Rio de La Plata'; but



## ARGENTUM—ARGES.

those provinces, 1827, returned to a state of isolation. In 1831, Buenos Ayres, Entre Rios, Corrientes, and Santa Fé, sometimes classed as the coast or riverine states, entered into a federal compact, and invited the others to form a voluntary alliance. This Argentine Confederation led to little but anarchy till 1835, when Gen. Rosas was elected capt.gen. or gov. of it, with almost absolute power. He secured order for a time; but his personal ambition, and his policy to make Buenos Ayres supreme, led to his ultimate overthrow 1851. Buenos Ayres refusing to submit to Urquiza, the next gov. of the A. R., declared itself independent 1854, but was compelled by a signal defeat at Cepeda 1859 to re-enter the confederation. Another war, in which its army was ably led by Gen. Mitre, placed that province in its present position of supremacy. In 1865, the A. R. became involved with Brazil and Uruguay in a war against Paraguay, which ended 1870, having accomplished little in the interest or to the credit of A. R. A revolution broke out in Buenos Ayres 1890, July, which resulted in the resignation of Pres. Celman, and the succession of the vice-pres., Carlos Pelligrini. A financial panic prevailed through the summer, and nearly bankrupted the Baring Bros. of London, fiscal agents of the A. R. Luis Saenz-Peña was elected pres. 1892, Apr., and Dr. Uriburu vice-pres. A state of siege had existed during the elections and the week preceding, and many prominent citizens, including the radical candidate for the presidency, Dr. Yrigoyen, were arrested. The govt. professed to have conclusive evidence against the arrested radicals of intended murder and the use of dynamite. The state of siege lasted until after the meeting of the electors in the provincial capitals June 2. The successful candidate, Dr. Luis Saenz-Peña, was supported by the two principal political parties. During the same year a scheme for colonizing Russian Jews in the A. R., patronized by Baron Hirsch of Paris, ended in utter failure after more than 200 Jewish families had settled on the lands apportioned for their use. The land selected for the colony was ill-chosen, and the people were not of the kind to establish pioneer settlements in a new country. In 1892, Aug., 800 of the colonists returned to Europe. The previous year (1891) no fewer than 28,000 persons (other than Jews) returned to Europe; but the tide of 'remigration' seemed to be growing slack 1892, and that of immigration began again to rise; the immigrants in Jan. numbered 4,228.

ARGENTUM, n. *ár-jěn'tŭm* [L.]: silver (q.v.); chem. abbreviation. Ag.

AR'GES: genus of small fishes, of the family *Siluridæ*, of extreme interest on account of their being frequently thrown out in vast numbers by some of the S. American volcanoes, with torrents of muddy water. Humboldt was the first accurately to inquire into this wonderful fact, and to describe one of these fishes, which he referred to the genus *Pimelodes*, and called *P. cyclopus*. It is now called *A. cyclopus*. The quantities of these fishes ejected from the volcanoes in the neighborhood of Quito are sometimes

## ARGIL—ARGILLACEOUS ROCKS.

so great, that the stench of their putrefaction is felt at a great distance, and putrid fevers are caused by it. They are expelled from craters or from lateral openings at an elevation of 16,000 or 17,000 ft. above the sea. It is supposed that they exist in lakes within the cavernous recesses of the mountains, but nothing is positively known on this subject. Their capacity of enduring the high temperature of the water with which they are ejected has excited much interest. Several species are known, to which the common name of *preñadillas* is given in the country, and which are placed by ichthyologists in the genus *A.*, and the closely allied genera *Brontes* and *Astroblepus*.

ARGIL, n. *ár'jíl* [L. *argil'la*, white clay: F. *argile*]: pure clay; potter's clay. ARGILLACEOUS, a. *ár'jíl-lā'shūs* [L. *argillā'cēūs*, clayey]: consisting of clay or argil; clayey. AR'GILLIF'EROUS, a. *-līf'ér-ūs* [L. *fero*, I produce]: producing clay, or abounding in clay. ARGILLITE, n. *ár'jíl-līt*, a term applied to clay-slate. Argil is a term now little used, but the derivative *argillaceous* is still in frequent use as descriptive of soils, geological deposits, etc., and in the name *Argillaceous Slate* or *Argillaceous Schist*, instead of which, however, the name *Clay-slate* (q.v.) is more generally employed. The term *argillaceous* is rather vague, and sometimes *clayey*, sometimes *aluminous*, would seem to be its equivalent. See ARGILLACEOUS ROCKS.

ARGILE PLASTIQUE, *ár'jíl plās-tík*: a series of beds at the base of the Tertiary system in France, resting on a conglomerate or breccia of rolled and angular chalk-flints. They consist of extensive deposits of sand, with occasional beds of plastic clays, used for pottery. Marls occur, inclosing, in some places, the fluviatile shells that are met with in the same position in the London basin, and in other places large numbers of a species of oyster. Beds of impure lignite also occur. The A. P. is the equivalent in the Paris basin of the Woolwich and Reading series, or Lower Eocene of the English geologists. See EOCENE.

ARGILLA'CEOUS ROCKS, *ár'jíl-lā'shūs*: all rocks composed entirely or to some extent of clay. Pure clay is known as *kaolin* or *porcelain clay*. It is a hydrated silicate of alumina. Decomposed feldspar, from which the silicates of potash, soda, etc., have been washed out, supplies the material which forms kaolin. *Common clay*, however, contains many impurities; the chief are sand, in variable proportions, and oxide of iron, which gives its color to the mass. Any matter that contains sufficient alumina (more than 10 per cent.) to enable it to retain its shape when molded and pressed, is called clay. Plastic clays occur abundantly in the superficial deposits in the Tertiary strata. The older clays become more or less indurated. When they are regularly laminated, and split into thin layers in the direction of the laminæ, they are called *shale*. In *clay-slate*, the clay has become highly indurated and metamorphosed, so as to split into plates that are altogether independent of the original lamination, and frequently cross it at right angles. Clay-



## ARGIVE—ARGOLIS.

slate forms extensive deposits in the Azoic rocks, but it is not confined to these, for the Palæozoic shales are often converted into clay-slate, when, from their proximity to crystalline rocks, or other cause, they have been subjected to the action of heat.

A. R. can generally be distinguished by the peculiar 'argillaceous' odor which they give out when breathed upon.

ARGIVE, n. *ár'jiv* [*Argos*, in Greece]: a Greek; pl. ARGIVI. See ARGOLIS.

ARGOL, or ARGAL (q.v.): a crude variety of cream of tartar which forms a crust in the interior of wine-vats and wine-bottles. Originally, it exists in the juice of the grape, and is soluble therein; but during the fermentation of the juice, and as it passes into wine, much alcohol is developed, which remaining in the fermenting liquor causes the precipitation of the A.; the latter being very sparingly soluble in an alcoholic liquid. Some wines, when they are bottled, are not fully ripe, and more alcohol being thereafter developed, a further precipitation of A. takes place as a crust in the bottles, and hence the meaning of the term *crusted port*. A. is generally of a reddish tinge, obtained from the color of the grapes, but sometimes is of a grayish-white color, when it has been deposited during the fermentation of the juice of colorless grapes. The *red* or *white* A. is denominated in commerce *crude tartar*, and its principal uses are in the preparation of cream of tartar (q.v.) and tartaric acid (q.v.). The constituents of A. are bitartrate of potash (cream of tartar), (KO,HO, $\bar{T}$ ), tartrate of lime, with coloring and extractive matters.

AR'GOLA: see ADJUTANT.

ARGOLIS, *ár'gō-līs*: the n. e. peninsula of the Morea (Greece), lying between the bays of Nauplia and Ægina, forming a nome, or department, in the modern kingdom of Greece. The plain of Argos, famous in ancient times for its breed of horses, is naturally fertile, but is now made pestilential by morasses. It is surrounded by an eastern continuation of the range of mountains on the n. of the Peloponnesus, which also girds the riven and shattered-looking coast. The highest summits attain an elevation of between 5,000 and 6,000 ft. The plain of A. is the most extensive in the whole peninsula, being 12 m. in length, and 5 in breadth. The e. part is higher and more rocky than the west. Near where the plain opens on the sea, the ground is marshy. This was the Lernean Marsh of antiquity. The nome of A. and Corinthia has now Nauplia as its capital, Pop. (1889) 144,836

It was from the importance of the ancient kingdom of A. that the Greeks were collectively often styled Argivi by ancient writers. A. was colonized in very early times. According to the old traditions, Inachus, the Pelasgic chief, settled here B.C. 1800, and Danaus, B.C. 1500, with colonists from Egypt. Here Pelops ruled, and was succeeded by Atreus, Agamemnon, etc. Here also Hercules was born.

## ARGON.

and achieved his victories over the Lernean hydra and the Nemean lion.

The ancient capital, Argos, was situated about 3 m. from the sea, and was considered the oldest city in Greece. It was supposed to have been built by that Inachus of whom we have spoken, or by his grandson Argus; but as the whole period in which his deeds are said to have been accomplished belongs to the unhistorical age, we cannot possibly determine the truth of such a statement. It is certain, however, that at one period A. was the head of a league composed of several Doric states or cities—Cleonæ, Phlius, Sicyon, Trœzen, Hermione, Ægina, and Epidaurus. Later, Sparta robbed it of its supremacy and influence. The population of A., during its most prosperous condition in ancient times, was—inclusive of the town-territory—upwards of 100,000. It was noted for the attention it paid to the worship of the gods. Juno was the principal divinity, but many of the other gods had temples and statues also. This gave a stimulus to the fine arts, and we know that A. had one of the most famous of the ancient schools of statuary. The natives were, moreover, renowned for their love of music. Herodotus considered them the finest musicians in Greece. They do not seem to have cultivated literature. Few poets, and no orators or philosophers, were born among them. The modern Argos, built on the site of the ancient, is 7 m. from Nauplia, and is a large and thriving town. It still exhibits some remains of antiquity, though these were nearly wholly destroyed in 1825, during the Greek war of independence. Cotton, vines, and rice are grown. Pop. 11,000.

ARGON, n. *âr'gõn* [Gr. *a*, without; and *ergon*, work]: elementary gas comprising about .008 of the weight of the atmosphere. Its discovery, ascribed to Lord Rayleigh in conjunction with Prof. Ramsay,—verbally announced 1894, Aug. 13, but fully described 1895, Jan. 31, at a meeting of the Royal Society of England,—is spoken of as a 'triumph of the last place of decimals,' owing to the extreme delicacy and exactitude of the experiments of the discoverers upon the density of atmospheric gases. Similar investigations had been conducted by Regnault (q.v.); and in 1785 the Hon. Henry Cavendish (q.v.) stood upon the brink of the same discovery. All of the many discoveries of new elements made within the past forty years, have been of rare metals. Not since 1826, when Balard discovered bromine (q.v.), had any addition been made to the list of non-metals. The discovery of A. is considered to rank in lustre with the achievement of Adams and Le Verrier in 1846, whose simultaneous but independent calculations led to the predicted existence at a certain point, and the subsequent discovery there, of the till then unknown planet Neptune.

Nitrogen, when derived chemically, has a constant density differing from the density of atmospheric nitrogen by a constant quantity. It was the attempt to explain this constant difference which led to the discovery of A. A. is obtained by two processes:



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In the first, common air is passed over red-hot copper, which absorbs much of the oxygen, the product being oxide of copper. The remaining gas, largely nitrogen, is then sent through a combustion-tube over more heated copper; a small U-shaped tube containing sulphuric acid, to indicate the rate of flow; a larger, straight tube containing soda-lime and pentoxide of phosphorus, to absorb any moisture or other impurity; and then another combustion tube filled with turnings of the metal magnesium, also raised to intense heat. Magnesium has an affinity for nitrogen, and heat favors their union. The gaseous residue passing thence is crude argon, the principal constituents of air having been almost entirely absorbed on the way through the apparatus.

The second method, a little more expeditious, is to put ordinary air into a closed glass vessel over an alkaline liquid, add a certain amount of free oxygen, and then send powerful electric sparks between the platinum terminals of suitable wires led into the vessel. By means of the intense heat of the electric arc the two gases are made to unite chemically, in a new proportion, and form nitrous acid, which is absorbed by the alkali. Finally, the crude argon is carefully refined by the use of the same substances (heated copper, soda-lime, phosphorus pentoxide, and magnesium) as are employed in the first process.

A. is a colorless, odorless gas; density about 19.90, hydrogen being the unit. It is about two and a-half times as soluble in water as nitrogen, 100 volumes of water dissolving 4.05 volumes of A. at 13.9°. At low temperatures and under high pressure it was first liquefied and solidified by Prof. K. Olszewski of the University of Cracow, the results of whose experiments, with additional figures for comparison, are tabulated as follows, the term 'critical' referring to the degree of temperature and amount of pressure requisite to effect a change from gaseous to liquid form:

| Name of substance. | Critical temperature (centigrade). | Critical pressure in atmospheres. | Boiling point. | Freezing point. | Density of gas. | Density of liquid at boiling point. | Color of liquid. |
|--------------------|------------------------------------|-----------------------------------|----------------|-----------------|-----------------|-------------------------------------|------------------|
| Hydrogen ....      | -220.0°                            | 20.0                              | ?              | ?               | 1.0             | ?                                   | Colorless        |
| Nitrogen.....      | -146.0                             | 35.0                              | -194.4°        | -214.0°         | 14.0            | 0.885                               | "                |
| Carbonic ox..      | -139.5                             | 35.5                              | -190.0         | -207.0          | 14.0            | ?                                   | "                |
| Oxygen.....        | -118.8                             | 50.8                              | -182.7         | ?               | 16.0            | 1.124                               | Bluish           |
| Argon.....         | -121.0                             | 50.6                              | -187.0         | -189.6          | 19.9            | About 1.5                           | Colorless        |

Professor William Crookes, F. R. S. E., discovered that in a vacuum-tube A. gives two distinct spectra according to the nature of the induction current employed; but, while the two spectra of nitrogen are of different types, one being a line and the other a band spectrum, those of A. are both line spectra,

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A. is remarkably inert (whence its name). At the time of the announcement of its discovery, none of its affinities were known; but M. Berthelot, a French chemist, soon found, not only that A. was not absolutely inert, but that it was chemically active under normal atmospheric conditions. The silent electric discharge causes it to combine with various organic compounds, notably benzene. It was subsequently extracted chemically by Lord Rayleigh and Prof. Ramsay from cleveite, a rare Norwegian earth, which was incidentally found at the same time to contain helium, a substance theretofore supposed to exist only in the sun and a few of the stars, being indicated in their spectra by a peculiar, simple yellow line.

Many of the properties of A. are still unknown. Its discovery opens up a great field for research. In view of its wide distribution, much time must probably elapse before its functions in the economy of both organic and inorganic nature can be fully determined. The atomicity of A. is a vexed question, though it is considered probably monatomic with atomic weight 40, approximately twice the density. Data bearing on this question point to a conflict of authority between the long-accepted periodic law of classification of the elements according to their atomic weights, discovered by Mendeléeff, and conclusions drawn from the ratio of specific heat at constant volume to that at constant pressure—thus possibly necessitating modification of chemical theory. A. is supposed by M. Berthelot to have some causal connection with the *aurora borealis*.

**ARGONAUT**, *n.* *ár'gō-nawt* [L. *argonauta*: Gr. *argonau'tēs*, an Argonaut—from *Argo*, Jason's ship: Gr. *nautēs*, a sailor (see **ARGEAN**)]: one who sailed in the ship *Argo*; the paper-nautilus, a cephalopodous mollusk. **ARGOSY**, *n.* *ár'gō'si* [Sp. *Argos*, the *Argo*]: a merchant-ship richly laden; a large merchant-ship.

**AR'GONAUT** (*Argonauta*): genus of cephalopodous Mollusca, generally known by the name of *Paper Nautilus*, and in consequence of similarity in the form of the shell, often confounded with the genus *Nautilus* (q.v.), but in fact much more nearly allied to the Poulpe (*Octopus*). The shell is not chambered like that of the true nautilus, but has one spiral cavity, into which the animal can entirely withdraw itself. The animal has no muscular attachment to the shell, and some naturalists therefore suspected that it might be merely, like the Hermit Crab, the inhabitant of a shell originally belonging to some other animal; but this question has been set at rest by the observations of Madame Power, proving the beautiful but fragile shell to be the production of the A. itself. It has, however, also been discovered that the shell is peculiar to the female A., and does not answer the ordinary purposes of the shells of mollusca, but rather that of an 'incubating and protective nest.' The eggs, which are very numerous, are attached to filamentary stalks, and by these the whole compacted mass is united to



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the involuted spire of the shell, where it is usually concealed by the body of the parent. The descriptions, until recently admitted into the works of the most reputable naturalists, of argonauts sailing about in pretty little fleets upon the surface of the water, employing six of their tentacula as oars, and spreading out two, which are broadly expanded

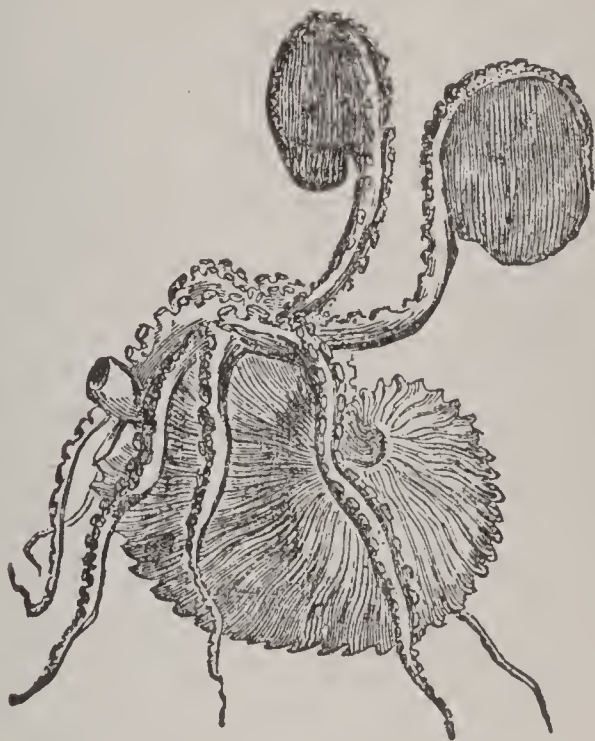


FIG. 1.

for the purpose, as sails to catch the breeze, are now regarded as entirely fabulous, and indeed are founded upon a misapprehension of the position of the animal in its shell, and of the use of the two expanded arms or *vela* (sails). The membranes of these arms are extended at the pleasure of the animal, so as to envelop the shell, and appear to be

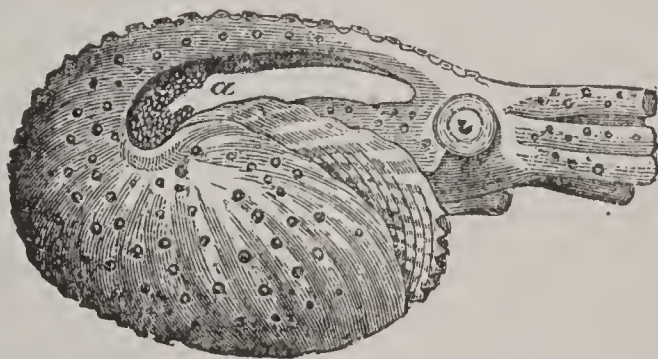


FIG. 2.

the secreting organs employed in its fabrication. Two species of A. are common in the Mediterranean. Fig. 1 represents one of them as it used to be commonly represented with oars and sails. Fig. 2 represents it as it really exists, with the membranes of the dorsal arms covering the shell. The other arms are cut off. At *a*, in Fig. 2, is seen the mass of eggs.

## ARGONAUTS.

ARGONAUTS, *âr'gō-nawts*: heroes of Greek antiquity [so named from their ship *Argo*], who, according to tradition, about a generation before the Trojan war, undertook a long voyage into unknown seas, under the command of Jason. Homer alludes to the story; Hesiod, Mimnermus, Pindar, the Pseudo-Orpheus, and many others relate it, all in different ways, the accounts in some instances being utterly irreconcilable. The plainest and most complete narrative is that of Apollodorus, as follows: Jason was commissioned by his uncle, Pelias—who ruled over Ioleus, in Thessaly—to fetch from the country of Æetes (Colchis) the golden fleece of the ram, which was suspended on an oak, and guarded by a sleepless dragon. He therefore caused Argus, the son of Phrixus, to build a ship of 50 oars; and in pursuit of this adventure gathered together the choicest heroes from all parts of Greece, 50 in number, with whom he sailed. The first landing-place was Lemnos, where the A. stayed two years, because the women, in consequence of the wrath of Aphrodite, had slain all the men, excepting Thoas. Next they sailed to the Doliones, and were hospitably received by King Cizyeus, who was afterwards accidentally killed by Jason. After landing at Mysia, where they left Hercules and Polyphemus—who had wandered too far inland in pursuit of the lost Hylas—they came to the country of the Bebryces, where King Amyeus was killed by Pollux, or Polydeuces, in a pugilistic fight. They next sailed along the coast of Thrace to Salmydessus, where two of their number, Zetes and Calais, having delivered the blind seer, Phineus, from certain winged monsters called Harpies, he in return gave them good counsel respecting their future adventures, and especially warned them against the dangerous passage between the opening and closing Symplegades, from which they escaped with but little injury to their vessel. The story goes that Phineus advised the A. to let loose a dove when they approached the dreaded rocks, and to judge from its fortune what they themselves might expect. The bird escaped with the loss of its tail. The A. resolved to risk the passage, and after heroic efforts got safely through, their ship only losing some of the ornaments of its stern. After visiting several other lands, they arrived at the mouth of the river Phasis in Colchis. Here the king, Æetes, promised to give up the golden fleece to Jason, on condition that the latter should yoke to a plough the two fire-breathing bulls with brazen hoofs, and should sow the dragon's teeth left by Cadmus in Thebes. Jason, by the help of the famous sorceress Medea, daughter of Æetes, who had fallen passionately in love with the bold navigator, fulfilled these conditions; and was also assisted by Medea in still more wonderful exploits. He obtained from her, under promise of marriage, a charm against fire and steel, and was enabled to destroy all the warriors who sprang up from the land sown with the dragon's teeth. While this was taking place, Æetes had resolved to burn the ship *Argo*, and put to death the crew; but Jason, informed of the scheme by Medea, anticipated it, hastened into the



grove, stupefied the dragon-sentinel by an opiate charm prepared by Medea, seized the golden fleece, and, embarking in the *Argo* with his mistress and her brother Absyrtus, sailed away from Colchis by night. Æetes followed, but was hindered in his pursuit by an atrocity committed by his fierce daughter. It is said that she slew her brother Absyrtus, and cut him into several pieces, which she threw overboard, one at a time. While King Æetes stayed to gather up the fragments of his son, Jason escaped from the pursuit. The A. now reached the mouth of the river Eridanus; but were driven on the Absyrtian Islands by a storm sent from Jove who was angry on account of the murder of Absyrtus. Meanwhile the mast of the *Argo*—which had been cut from the sacred grove of Dodona—delivered an oracle to the effect that Jove could not be appeased unless they sailed towards Ausonia, and were purified through the expiatory agency of Circe. This was accomplished; and, next, the A. passed by the Sirens, from whose charms they were preserved by Orpheus, who sang to them, but could not hinder one of their number, Butes, from swimming off to the sea-maidens; then through Scylla and Charybdis, by the help of Thetis, and at length landed on the island of Corcyra, where Alcinous ruled. On leaving this place, they encountered a storm at night, but were saved by Apollo, who, in flashes of lightning, revealed to them the haven of Anaphe, where they raised an altar to their preserver. At Crete, their landing was opposed by the giant Talus, who was slain by Medea. They subsequently touched at Ægina, and, sailing between Eubœa and Locris, arrived safely at Iolcus, after a four months' voyage. Jason dedicated the good ship *Argo* to Neptune, at the Isthmus of Corinth.

It is perhaps useless to speculate on the real character of the Argonautic expedition, even if it be more than a mere myth. The accounts given by other writers differ so widely, especially in the geographical parts, from those of Apollodorus, that it becomes impossible to determine satisfactorily whether the expedition sailed north, east, or west. The common historical interpretation of the legend is that Jason sailed on a voyage of discovery, which had for its aim and stimulus the hope of new commercial relations; others would modify this hypothesis, and suggest that the enterprise was partly commercial, partly piratical, and partly adventurous, and that Jason's crew was in all probability composed of young, restless, and ambitious spirits, who were ready for anything that might turn up.

ARGOS: see ARGOLIS.

ARGOSTOLI, *âr-gôst'ô-lê*: seaport on the s.w. of Cephalonia; cap. of the island; lat. 38° 10' n., long. 19° 59' e.; its quay is a mile long. Pop. 8,000.

ARGOT, n. *âr-gôt* [F. *argot*, slang]: one of the wanderers or waifs of society; the secret or cant language of London thieves.

ARGOVIE: see AARGAU.

ARGUE, v. *âr'gû* [L. *argu'ërë*, to declare; F. *arguer*;

It. *arguire*—*lit.*, to make clear]: to debate or discuss; to reason; to dispute. AR'GUING, *imp.* ARGUED, *pp.* *ár'-gūđ.* AR'GUER, *n.* one who argues. ARGUMENT, *n.* *ár'gū-mēnt*, a reason alleged or offered; a discussion. ARGUMENTABLE, *a.* *ár'gū-mēn'tā-bl*, that may be argued. ARGUMENTA'TION, *n.* *-tā'shūn*, reasoning; the act of reasoning. AR'GUMEN'TATIVE, *a.* *-tā'tiv*, consisting of argument; given to argument. AR'GUMEN'TATIVELY, *ad.* *tiv-lī.* AR'GUMEN'TATIVENESS, *n.* the quality of being argumentative.—*SYN* of 'argue': to debate; dispute; deliberate; discuss; contend; evince; reason; expostulate; remonstrate; manifest; prove;—of 'argument': argumentation; reason; reasoning; discussion; controversy; proof.

ARGUELLES, *ár-gwě'l'yēs*, AUGUSTIN: a prominent Spanish politician 1776, Aug. 28-1844, Mar. 23. *b.* Ribadesella. On the breaking out of the war of independence in 1808, he went to Cadiz, where he agitated for the organization of a regency, with a free constitution, as the best method of consolidating the resources of the nation. In 1812, he was sent as representative of his native province to the cortes, where he was appointed one of the members of the committee to whom was intrusted the drawing up of the plan of a new constitution. His splendid talents as a public speaker soon won him the admiration of the liberal party, who used to term him the Spanish Cicero. But on the return of Ferdinand VII., A. fell a victim to the reactionary spirit which ensued, and, 1814, May 10, he was arrested and imprisoned; but at his trial he displayed such dexterity that it was found impossible to convict him. Different judges were nominated five successive times, but they could not agree in their decision. At last the monarch himself passed sentence, which was, that A. should be confined for ten years in the prison at Ceuta. He was not, however, alone in his misfortunes. Fourteen persons were condemned with him, among whom was his friend Juan Alvarez Guerra. In their confinement they experienced such barbarous treatment that in four years three died, two became mad, and the rest received grievous injuries. The revolution of 1820 restored them to freedom. A. became minister of the interior, but soon resigned, in consequence of the king complaining of the weakness of the executive. Although provoked beyond measure by the narrow bigotry of the court, he did not rush into extremes, but continued a constitutional liberal to the end of his life. In the cortes at Seville in 1823, he voted for the suspension of the royal power; but after the violation of the constitution he fled to England, where he remained till the amnesty of 1832. On his return to Spain, being nominated to the cortes, he was repeatedly made president and vice-president of the chamber of deputies, and always showed himself a moderate but unwavering reformer. In July, 1841, on the discussion of the law regarding the sale of church property, he delivered himself strongly against all concordats with the pope. Next to Espartero, he was the most popular man in the kingdom with the enlightened party. During the regency, he was appointed guardian to the



## ARGUMENT—ARGUS.

young queen, Isabella, but died soon after at Madrid. In his old age he still exhibited the fiery eloquence that marked his youth.

**AR'GUMENT**, in Logic: properly, the ground or premise on which a conclusion is rested; popularly it is applied to a series of reasons alleged, or to a controversy. *Argumentation* is reasoning put into regular shape, with a view to convince or silence an objector. Logicians have given distinctive names to various kinds of arguments. Thus, we have the *Argumentum ad hominem*, which is no real proof, but only an appeal to the known prepossessions or admissions of the persons addressed. In this style, when a man upholds one method of fraud, he may, by an appeal to his consistency, be driven to uphold another. The *A. ad veritatem*, again, has no regard to anything save objective truth. Next we have the *A. e consensu gentium*, or an appeal to the common belief of mankind, which, of course, may be used to prove or disprove anything. The *A. a tuto* rests upon the supposed safety or prudence of adopting a certain conclusion. It is so often used by Roman Catholics against Protestants in the following form: Protestants teach that salvation is possible in any church; this is denied by Catholics; therefore, it is safer to belong to the Catholic Church, as even the Protestant admits that a man may be saved in that church. Lastly, the *Argumentum a baculo* (or use of the cudgel), though objectionable, may be called concise in its style, and has settled many controversies.

**ARGUMEN'TUM AD HOM'INEM**: see **ARGUMENT**.

**ARGUS**, n. *âr'gûs*: in Gr. and L. Myth., son of Zeus and Niobe, succeeded Phoroneus in the government of the Peloponnesus, which took from him its name of Argos, as did also the territory of Argolis.

**ARGUS**, a fabled being surnamed Panoptes (all-seeing), had one hundred eyes, some of which were always awake. He was enormously strong, and on account of his wonderful exploits Juno appointed him to watch over Io, transformed into a cow. Mercury being commissioned by Zeus to carry off the cow, slew A. by stoning him; or, as Ovid says, first charmed him to sleep by playing on the flute, and then beheaded him. Juno used the eyes of A. to decorate the peacock's tail. The name A. is used to designate a very watchful person.

**ARGUS**: the builder of the ship *Argo*. See **ARGONAUTS**.

**AR'GUS** or **ARGUS PHEASANT**: genus of gallinaceous birds, remarkable for magnificence of plumage. The only known species is *A. giganteus*, formerly called *Phasianus A.*, and still, very generally, the *A. pheasant*. The sides of the head and neck are destitute of feathers; the tail consists of twelve feathers, of which the two middle ones in the male are very much elongated; the secondary feathers of the wings are much longer than the primary. The name A. has allusion to the many beautiful eye-like markings which adorn the plumage of the male, and particularly the secondaries of the wings. The long secondaries are said to impede the flight of the bird; but

## ARGUTE—ARGYLL.

its wings are much employed to aid it in running. The female is of comparatively tame plumage, not only wanting the eye-like markings, but even the great length of the secondaries and of the middle tail-feathers. The size of the bird, when divested of its plumage, is not much greater than that of a common barn-door fowl, but the tail-feathers



Argus Pheasant (*A. giganteus*).

of the male are nearly four ft. long. The A. is a native of Sumatra and other eastern islands, of the peninsula of Malacca, Siam, etc. It is said to be found even in the n. parts of China. It is impatient of confinement, and has very seldom been brought alive to Europe.

ARGUTE, a. *âr'gūt* [*L. argūtus*, sharp, piercing]: acute; shrewd; subtle. ARGUTE'NESS, n. acuteness or wittiness.

ARGYLL, *âr-gīl'*, ARCHIBALD CAMPBELL, Marquis of, 1598-1661: an eminent political character of the 17th c.; succeeded to the earldom of A. 1638. Already he had shown that religious principle which marked his whole life, and that perilous union of attachment to the king and of faith in the principles against which the king made war. In the general assembly at Glasgow, 1638, Nov., he openly took the side of the Covenanters, and thenceforth became recognized as their political head. In 1640, he commanded a military expedition through Badenoch, Athole, Mar, and Angus, for the purpose of enforcing subjection to the Scottish parliament. On the king's visit to Scotland, in 1641, he found it convenient to show peculiar favor to A., and created him a marquis. On the breaking out of hostilities, A. was still desirous for negotiation, but was finally compelled to take the field. In April, 1644, he dispersed the royalist forces under the Marquis of Huntly, in Aberdeenshire. He was less successful in withstanding



## ARGYLL.

the genius of Montrose, who, 1645, Feb. 2, almost annihilated his army at Inverlochy. His estates had suffered so much in the preceding year from the ravages of the brilliant cavalier, that a sum of public money was voted for his support. In Aug., 1646, he went to London, with Loudon and Dunfermline, to treat with the parliament for a mitigation of the articles presented to the king. He was at the same time the bearer of a secret commission from the king to treat with the Duke of Richmond and the Marquis of Hertford, on the propriety of a Scottish demonstration in favor of Charles. On the defeat of the 'Engagement' plan, to which he had been decidedly opposed, the government of Scotland devolved on A. and the other Presbyterian leaders. In the parliament of Feb. 1649, Charles II. was proclaimed king, and at Scone, 1651, Jan. 1, A. put the crown on his head. At this time it was even said that the complaisant monarch intended to marry one of his daughters. As head of the committee of estates, A. took vigorous measures to oppose Cromwell's invasion of Scotland, and still adhered to the king, after the subjugation of the country. After the battle of Worcester, he retired to Inverary, where he held out for a year against Cromwell's troops. Falling sick, he was taken prisoner by General Dean. He refused submission to the Protector, but took an engagement to leave peaceably, which he strictly kept. On the Restoration, he repaired to Whitehall, encouraged by a flattering letter from the king to his son. Impeached with the crime of having submitted to the usurper (to whom he had refused allegiance), he was committed to the Tower, and 1661, Feb. 13, was brought before the Scottish parliament on the charge of treason. He defended himself with spirit, but in vain. He was condemned, and suffered death at Edinburgh, May 27, having displayed dignity and meekness through his trial, and on the scaffold.

ARGYLL, ARCHIBALD (CAMPBELL), 9th Earl of: son of Archibald Campbell, Marquis of A.: was early distinguished by personal accomplishments, and exhibited great bravery on the disastrous day of Dunbar, where he commanded a regiment on the royal side. After Worcester, he continued, like his father, in arms, and made himself so obnoxious to the parliamentary leaders, that he was specially excepted by Cromwell from the act of grace in 1654. After much harassing persecution, he submitted to the parliament, but continued to be closely watched. On the restoration of Charles II., he was received into high favor (as a balance to the execution of the death sentence on his father), and, unfortunately for his own fame, participated in some of the iniquitous acts of the Scottish legislature. He had, however, numerous and active enemies; and, on the ground of an intercepted letter, in which he had complained of neglect, he was tried and condemned to death by the Scottish parliament for the imaginary crime of *læsa majestas*. The influence of Clarendon restored him to liberty and favor; even the king himself was favorable to him; but his explanation in

## ARGYLL.

subscribing the infamous test framed by the Scottish parliament in 1681 was declared treasonable, and he was again condemned to death. The devotion of his wife enabled him to escape from Edinburgh Castle in the disguise of a page; and after remaining concealed some time, he fled to Holland. Landing in the n. of Scotland, 1685, May, with an armed force, to co-operate in the revolt of Monmouth, he was, after a series of misfortunes, taken prisoner, hastily condemned, and beheaded 1685, June 30. His son Archibald, one of the deputation sent by the Scottish convention to present the crown to the Prince of Orange, was created Duke of Argyll, 1701.

ARGYLL, GEORGE JOHN DOUGLAS (CAMPBELL), 8th Duke of: b. 1823; succeeded his father in 1847. At the age of 19, his grace, then Marquis of Lorne, wrote a pamphlet entitled *A Letter to the Peers from a Peer's Son*, on the subject of the struggle which ended in the disruption of the Scottish Church. Seven years later he published an essay on Presbytery, which contains a historical vindication of the Presbyterian system. On taking his seat in the house of peers, he soon commanded the respect of that dignified assembly. On the formation of the coalition ministry by Lord Aberdeen, his grace was invested with the office of Lord Privy Seal, which he continued to hold in Lord Palmerston's administration. In 1855, he became postmaster-general. In Palmerston's next ministry, formed in 1859, he again successively held the same office. Mr. Gladstone appointed him secretary of state for India in 1868 and again in 1880. He resigned office in 1881, disapproving the Irish Land Bill. In 1874, he had supported the abolition of patronage in the Church of Scotland. In 1854, he was chosen lord rector of the Univ. of Glasgow; in 1855, presided at a meeting of the British Assoc. in that city; and in 1861, was elected president of the Royal Soc. of Edinburgh. His grace was hereditary master of the queen's household in Scotland, chancellor of the Univ. of St. Andrews, trustee of the British Museum, also hereditary sheriff and lord-lieut. of Argyleshire. Besides numerous papers on zoology, geology, etc., he published *The Reign of Law*, 1866; *Primeval Man*, 1869; and, in 1870, *A History of the Antiquities of Iona*. An important work by him on the *Unity of Nature* appeared 1884. His eldest son, the Marquis of Lorne, married the princess Louise in 1871; and in 1878 was appointed governor-general of Canada. (The ducal title A. was formerly spelt Argyle.) D. 1900, April 24.

ARGYLL, JOHN (CAMPBELL), 2d Duke of: 1678-1743, Sept. 3: son of the first Duke of A.: took an important part in the political and military affairs of his time. As royal commissioner in 1705, he had a principal share in bringing about the Act of Union. As a soldier, he distinguished himself under Marlborough at Ramilies, Oudenarde, Lille, Ghent, and Malplaquet. Previous to the change of ministry in 1710, A. had been a keen whig. He now veered with the wind of the court, and became a declaimer against the Duke of Marlborough. As the



## ARGYLESHIRE.

reward of his apostasy, he was appointed by the tories generalissimo of the British army in Spain; but considering himself unhandsomely treated by the ministry, he shortly afterwards returned, and finding his influence greatly diminished, he again became a whig. His career up to the rebellion of 1715 was most tortuous and unprincipled, and seriously detracts from his meritorious services during that critical period. He was, however, completely successful in quelling disturbances, and his services were rewarded in 1718, among other dignities, with an English peerage, and the title of Duke of Greenwich. His restless vanity and ambition, however constantly prompted him to political intrigues. In 1721, he again played into the hands of the tories, for the purpose of securing the entire patronage of Scotland. In 1737, he rose into immense popularity in his own country, by his spirited defense before parliament of the city of Edinburgh in regard to the Porteous mob. He died on the 3d Sept. 1743. He was a man of lax principles and selfish character, but possessed of considerable shrewdness and talent, and noted for kindness and courtesy in private life, which procured him the title of "the good Duke of Argyll."

ARGYLESHIRE, *àr-gìl'shèr* [*Airer-Gaedhil*, territory of the Gael]: a county in the w. of Scotland, cut up into many peninsulas by arms of the sea, and including numerous islands. It is bounded n. by Inverness-shire; w. and s. by the sea; e. by Perthshire, Dumbarton, Loch Long, and Firth of Clyde. Its greatest length is about 115 m.; greatest breadth, about 60 m.; its extent of coast-line is very great, amounting to 663 m., owing to the indentation of the coast by numerous lochs running inland. Next to Inverness, it is the largest county in Scotland—area, 3,210 sq. m., of which 1,063 are occupied by the numerous islands. No part is above 12 m. from the sea or from large inland lochs. The county is divided into the districts of Cantire, North and South Argyle, Lorn, Appin, Cowal, Morven, and Sunart. The chief islands are Mull, Islay, Jura, Tiree, Coll, Lismore, and Colonsay, with Iona and Staffa. There are upwards of thirty other islands of smaller size. The general aspect of A. is wild and picturesque, marked by rugged and lofty mountains and deep inland bays. There are some fertile valleys. The n. part is entirely mountainous, and presents some of the grandest scenery in Scotland, as Glencoe. The highest peaks are Bidean nam Bian, 3,766 ft.; Benloy, 3,708; Ben Cruachan, 3,689; Ben Starav, 3,541; Ben Doran, 3,523; Buachaille Etive, 3,345; Ben-a-Bheithir, 3,362; Culvain, 3,224; Sgor Dhombail, 2,915; Ben More (Mull), 3,185. The chief bays are (going south)—Loch Moidart, Loch Sunart, Liunhe Loch, branching off into Loch Eil and Loch Leven, Loch Fyne, and Loch Long. There are no rivers of any size. The streams are short and rapid, the principal being the Urchay, running through Glenorchy into Loch Awe, and the Awe, connecting that lake with Loch Etive. The inland or fresh-water lochs are Loch Awe and Loch Lydoch. The rocks of A. are mica-slate,

## ARGYNNIS—ARIA.

which predominates on the mainland; trap in Mull and Lorn; quartz rock in Islay and Jura; granite around Loch Etive and in Knapdale; patches of lias and oolite in many of the isles; and a little old red sandstone w. of Loch Fyne and in South Cantire. Lead-mines occur at Strontian (where the mineral Strontianite was discovered, and from which the names of the earth called *Strontia* and the metal *Strontium* are derived), at Tyndrum, and in Islay and Coll. There is a copper-mine in Islay. The Easdale and Ballachulish quarries supply the best roofing-slates in Scotland. Coal occurs near Campbelton; fine marble in Tiree, etc.; excellent granite near Inverary; and limestone in most parts of the county. The fertile parts of A. lie along the arms of the sea and the mountain streams. The soil is mostly a light, sandy, and gravelly loam, along the coasts and the sides of rivers, and gravelly, with a till bottom, on the hillsides. Sheep and cattle rearing are the chief occupations of the farmer. More sheep are reared in A. than in any other Scotch county, and nearly a million acres are in permanent pasture. In number of cattle, A. yields only to the counties of Aberdeen, Ayr, Lanark, and Perth. In 1881, A. had 24,481 acres under grain, and 12,990 under green crops, as well as 60,154 acres under permanent pasture, exclusive of heath, or mountain land. A. abounds in deer and game. Loch Fyne is famed for its herrings. Loch Awe abounds in salmon and trout.

In many parts of A. the peasantry are still very poor, notwithstanding that steamers now connect every portion of the coast with the commercial centre of Scotland. The manufactures are unimportant, the chief being whisky, in Campbelton and Islay, and coarse woolens for home use. The chief towns and villages are Inverary, Campbelton, Oban, Dunoon, Lochgilphead, Tarbert, and Tobermory. The three former unite with Ayr and Irvine in returning one member to parliament; the county returns another. This extensive county is divided ecclesiastically into not more than fifty parishes, which contain only two royal burghs, Inverary and Campbelton, the former of which is a station of the Circuit Court of Justiciary. The principal proprietors are the Duke of Argyle, the head, and the Earl of Breadalbane, a branch of the Campbell family. Among the antiquities of A. are the ruins of Iona and Oronsay, and many *duns*, or circular forts, along the coast. In Cantire formerly lived the Macdonalds, or Lords of the Isles, whose power was weakened by James III. Pop. (1881) 76,440; (1901) 73,642, mostly using the Gaelic language; a considerable decrease since 1831, chiefly from emigration; (1891) 74,085.

ARGYNNIS: a name of Venus (q.v.).

ARIA, n. *ār'ī-ă* [It. *ariă*; F. *air*, breath—from L. *āēr*, air]: an air or tune, in *music*; a rhythmical song, as distinct from recitative. The term was formerly applied to a measured lyrical piece either for one or several voices; but is now commonly applied to a song introduced in a cantata, oratorio, or opera, and intended for one voice



## ARIADNE—ARIANO.

supported by instruments. **ARIETTA** or **ARIETTE**, a short melody or tune. **ARIOSO**, a passage in the style of the A., often introduced into recitative. **A. BUFFO**, a comic song, etc.

**ARIADNE**, *á'rĭ-ăd'nē*: in Legend, daughter of Minos, king of Crete, by Pasiphaë. When Theseus, with the offerings of the Athenians for the Minotaur, landed in Crete, A. conceived a passion for the beautiful stranger, and gave him a clew by means of which he threaded the mazes of the labyrinth, and was enabled to slay the monster. For this service Theseus promised to marry her, and she escaped with him, but was slain by Diana on the island of Naxos.—According to another tradition, A. was left by Theseus at Naxos, where she was found by Bacchus returning from his triumph in India, who was captivated by her beauty, and married her. At her death he gave her a place among the gods, and suspended her wedding-crown as a constellation in the sky. A., as left forsaken by Theseus, and as married to Bacchus, has been a favorite subject with artists.

**ARIALDUS**, *a-rĭ-al'dus*: a deacon of the church of Milan, during the 11th c.; prominent in the ecclesiastical contentions of his times. The Rom. Cath. Church in the n. of Italy was then very corrupt, a wide-spread licentiousness, originating from the unnatural institution of priestly celibacy, prevailing. Great numbers of the clergy kept concubines openly. Such as looked earnestly in those days at this flagrant evil were disposed to consider the strict enforcement of celibacy the only effectual cure. Chief among these reformers stood A., whose life was one continued scene of violent controversy. Although successively sanctioned by Popes Stephen X., Nicholas II., and Alexander II., he found little sympathy among his brethren, and used to complain that he could get only laymen to assist him in his agitation. Having at length succeeded in obtaining a papal bull of excommunication against the Abp. of Milan, a fierce tumult ensued in the city, whose inhabitants declared against A. and his coadjutors. A. now fled to the country; but his hiding-place being betrayed, he was conveyed captive to a desert isle in Lake Maggiore, where he was murdered by the emissaries of the abp., and his remains thrown into the lake, 1066, June 28. He was afterwards canonized by Pope Alexander II.

**ARIAN**, n. *ā'rĭ-ăn*: one adhering to the doctrines of *Arĭūs*, who taught that Jesus was inferior to God, and that the Holy Spirit is not God: **ADJ.** pertaining to Arius. **ARIANISM**, n. *ā'rĭ ăn-izm*, the doctrines of the Arians. See **ARIUS**.

**ARIA'NA**: see **ARYAN RACE**.

**ARIANO**, *ā-rĕ-ă'nō* (*Arianum*): city of s. Italy, province of Avelino, beautifully situated, 2,800 ft. above the sea, in one of the most frequented passes of the Apennines: 50 m. n.e. from Naples. It is a bishop's seat, and has a fine cathedral. Pop. 12,600.

## ARIAS MONTANUS—ARIÈGE.

**ARIAS MONTANUS**, *a'ri-ās mōn-tā'nūs*, **BENEDICTUS**: 1527–1598: b. in the village of Frexenal de la Sierra, among the mountains separating Estremadura from Andalusia: a Rom. Cath. divine, noted as a linguist. He studied at Seville and Alcalá de Henares, where he distinguished himself in the acquisition of Arabic, Syriac, and Chaldee. On a tour through Italy, France, Germany, England, and the Netherlands, he obtained a knowledge of various modern tongues. He was at the celebrated Council of Trent; but on his return to his own country he gave his whole time to literature. In 1568, Philip II. persuaded him to superintend at Antwerp the publication of the famous edition of the 'Polyglot Bible,' executed in that city at the suggestion of the printer, Christopher Plantin. After four years' labor the work, issued under the title *Biblia Sacra, Hebraice, Chaldaice, Græce, et Latine, Philippi II. Regis Catholici Pietate et Studio ad Sacrosanctæ Ecclesiæ Usus Chph. Plantinus excudebat*, was received with universal applause; though the Jesuits, to whom A. was strenuously opposed, alone attempted to fasten the charge of heresy on the author, who made several journeys to Rome to clear himself of the accusation. Philip II. rewarded him with a pension of 2,000 ducats, besides various other emoluments. He died at Seville. His literary works are very numerous. They relate principally to the Bible and to Jewish antiquities; but he also wrote a poem on Rhetoric, and a History of Nature.

**ARICA**, *â-rē'kā*: seaport of Tachna, the most s. department of Peru; lat. 18° 28' s., long. 70° 24' w. Though it has merely a roadstead, it affords safe anchorage to shipping, and is one of the chief outlets of the trade of Bolivia, being connected with La Paz in that republic by a mulepath which leads across the west Cordillera of the Andes. Its exports mostly consist of copper, silver, alpaca, wood, and guano. A. has frequently suffered from earthquakes; a most destructive one occurred in 1868. It was stormed and taken by the Chilians in 1880, and afterwards set on fire. About 230 vessels of some 260,000 tons enter this port annually, and about the same number clear it with cargoes. The climate is salubrious. Pop. about 4,000. The dept. of Tacna is now held by Chile (q. v.).

**ARICHAT**, *â-re-shât'*: seaport of Cape Breton Island, province of Nova Scotia, with a harbor for the largest vessels. It is near the Gut of Canso, the most southerly of three channels of communication between the Gulf of St. Lawrence and the Atlantic. The town is largely engaged in fishing, and at the head of its harbor a lead-mine has recently been opened. Pop. abt. 1,000.

**ARID**, *a. ār'īd* [L. *arīdus*, dry; F. *aride*]: dry; devoid of moisture. **ARIDITY**. *n. ā-rīd'ī-tī*, or **AR'IDNESS**, *n.* dryness; want of moisture.

**ARIDAS**, *ār'ī-dās* [from some of the Indian languages]: a kind of taffeta from the East Indies woven of fibres from various plants.

**ARIÈGE**, or **ARRIEGE**, *â'rē-āzh'*: river in the s. of France,



## ARIES—ARION.

risers in the dept. of the East Pyrenees, flows through a beautiful vale, and falls into the Garonne near Toulouse.

The dept. of ARIÈGE, along the n. slopes of the Pyrenees, formed a part of the old county of Foix, the territory of Couserans, and the province of Languedoc; bounded n. and w. by Haute Garonne, e. by Aude, s. by the republic of Andorra and the Pyrenees. It contains some of the highest mountain-summits in France, such as Fontargente, 9,164 ft.; Serrère, 9,592 ft.; Montcalm, 10,513 ft.; Estats, 10,611 ft.; Montvalier, 9,120 ft. The dept., nevertheless, has a mild climate. Area 1,880 sq. miles. The inhabitants are engaged chiefly in agriculture, pasturage, iron mines, and the manufacture of woolens, linen, pottery, etc. The three arrondissements are Foix, Pamiers, and St. Girons. Chief towns—Foix, Pamiers, St. Girons. Pop. of A. (1891) 227,491; (1901) 210,527.

ARIES, n. *ār'ī-ēz* [L. a ram, an anc. battering-ram]: the Ram; one of the signs of the zodiac, including the first 30 degrees of the ecliptic measured from the vernal equinox, or that point where the vernal passage of the sun across the equator takes place. The vernal equinox, or, as it is also called, the first point of A., is constantly changing its position among the fixed stars, in consequence of the precession of the equinoxes, moving w. at the rate of 50"·2 annually. It is from this circumstance that the sign A. no longer corresponds with the constellation A., as when, about 2,000 years ago, the ecliptic was divided into 12 equal parts called signs, each named after the group of stars through which it passed. The present sign A. is in the constellation Pisces, about 30' w. of the original sign; and although the sun at the vernal equinox will always be at the first point of A., yet nearly 24,000 years will elapse before that point will again coincide with the beginning of the constellation A.

ARIGHT, ad. *ār-rīt* [AS. *ariht*, on right]: in a proper form; rightly; without mistake.

ARIL, n. *ār-īl'*, or ARILLUS, n. *ār-īl'ūs* [F. *arille*, an arillus: Sp. *arillo*, a small hoop—from *aro*, a hoop—from L. *arīdus*, dry]: a peculiar covering of the seed in some plants, formed by an expansion of the *funiculus* (the cord which attaches the ovule to the *placenta*), or of the placenta itself, as in the pulpy A. of the white water-lilies and passion-flowers, and in the hairs of the willow-seed. This expansion takes place after fertilization, and sometimes invests the seed entirely, sometimes only partially. ARILLED, a. *ār-īld'*, or ARILATE, a. *ār-īl'āt*, having an aril. ARILLODE, n. *ār-īl-ōd* [Gr. *eidos*, resemblance]: an investment, somewhat similar to the A., but derived from the neighborhood of the micropyle, as in the mace of the nutmeg, and the brightly colored investment of the seed of the spindle-tree.

ARINOS, *ā-rē'nōs*: river of Brazil, which after a n.w. course of 700 m., enters the Tapajos, itself an affluent of the Amazon; lat. 9° 30' s., and long. 58° 20' w.

ARI'ON; a celebrated lute-player, native of Methymna,

## ARIOSTO.

in Lesbos, about B.C. 700: regarded by the ancients as the inventor of the dithyrambic metre. According to a tradition first given by Herodotus, afterwards decorated by the poets, A. was sent by Periander, ruler of Corinth, to Sicily and Italy, and at Tarentum won the prize in a poetical contest. As he returned laden with gifts in a Corinthian ship, the avaricious mariners determined to slay him and seize his wealth; of this the poet-musician was forewarned by Apollo in a dream. He asked for permission to try his skill in music; and after playing on his lute, threw himself from the deck into the sea. Here several dolphins, charmed by his music, had assembled round the vessel. On the back of one of them the musician rode safely to the promontory of Tænarus, where he landed, and journeyed on to Corinth. The sailors, who, arriving afterwards, assured Periander that A. was dead, were confronted with him, when they confessed their guilt, and were crucified. The lute and dolphin were raised among the constellations; and the story became a favorite theme with artists. A. W. Schlegel, in one of his best poems, gives this story of A.

ARIOSTO, *â-re-os'to*, LUDOVICO: one of the greatest of Italian poets: 1474, Sep. 8—1533, June 6; b. Reggio; eldest son of the military governor of that city. He was bred to the law, but abandoned it for poetry. However, at an early period of life, he was compelled to exert himself for the support of a large family, left as a burden on him at the death of his father. His imaginative powers were developed in early life. In 1503, after he had written two comedies, with several lyrical poems in Latin and Italian, he was introduced to the court of the Cardinal Hippolytus d'Este, who employed him in many negotiations. Here, in Ferrara, in about ten years, he produced his great poem *Orlando Furioso*, pub. in that city, in one vol. 4to, in 1516, in forty cantos. After the death of the cardinal, the duke, his brother, invited the poet to his service, and acted to him with great kindness and liberality. In the early part of 1521, a second edition of his poems was published, the *Orlando Furioso* being still in forty cantos. Shortly after he was commissioned by the duke to suppress an insurrection which had broken out in the wild mountain-district of Garfagnana; a task which seems more like a punishment than a mark of honor. A., however, succeeded in this arduous undertaking; and after remaining three years governor of the quarter, he returned to Ferrara, where he lived comfortably, nominally in the service of his patron, but in reality enjoying what he highly prized—an abundant leisure for prosecuting his studies. It was at this time that he composed his comedies, and gave the finishing touch to his *Orlando*. At length, in the latter part of 1532, that poem made its appearance in a third edition, enlarged to its present dimensions of forty-six cantos. He now became seriously ill of a painful internal distemper, of which, after a few months of suffering, he died on the 6th of June, 1533, in his fifty-ninth year, and was buried in the church of San Benedetto, at Ferrara, where a magnificent



monument indicates the resting-place of his remains. A is described as a man of noble personal appearance and amiable character. His *Orlando Furioso* is a romantic, imaginative epic, marked by great vivacity, playfulness of fancy, and ingenuity in the linking together of the several episodes. It takes its name and its theme from a chivalrous romantic poem by Boiardo, the *Orlando Innamorato*. That poem treats of the wars between Charlemagne and the Saracens, confounded as they were by tradition with those of Charles Martel, wherein Orlando, or Roland, stood forward as the champion of Christendom. Orlando is the hero of Boiardo's piece, and falls in love with Angelica, a clever and beautiful oriental princess, sent by the Paynim to sow discord among the knights of the Christian armies. The story of this lady, being left unfinished in the *Orlando Innamorato*, is taken up by A., who makes her fall in love herself with an obscure squire Medoro, on which Orlando gets furious, and long continues in a state of insanity. Besides his great work, A. wrote comedies, satires, sonnets, and a number of Latin poems, all more or less marked with the impress of his genius. In 1845, Giamperi, a librarian of Florence, announced that he had discovered at Argenta, near Ferrara, an autograph manuscript by A., containing a second epic, *Rinaldo Ardito*, describing, like the *Orlando*, the battles of Charlemagne and his paladins against the Saracens. The manuscript had been mutilated, and contained in a complete form only the cantos 3, 4, 5, while 2 and 6 were imperfect; and it was stated that the entire poem had consisted of twelve cantos. The work was published under the title *Rinaldo Ardito di L. Ariosto, Frammenti Inediti Pubblicati sul Manoscritto Originale* (Florence, 1846). In genius and style, it has been found by critics not to accord with the *Orlando*. Of the *Orlando* there are many English translations: by Harrington (1607 and 1634); Croker (1755); Huggins (1757); Hoole (1783); and by Stewart Rose (1823). In the last only is there to be found a fair representation of the feeling and spirit of the original. One of A.'s comedies had been rendered into English by Gascogne as early as the year 1566.

ARIOVISTUS, *ā'rī-ō-vīs'tūs* [probably the latinized form of the German *Heer-fürst*, army-prince]: a German chief in the century before Christ, leader of the Marcomanni and other German tribes, who was requested by the Sequani, a Gallic people, to assist them in a contest against the Ædui. Having gained a victory for the Sequani, A. was so well pleased with their fine country (now Burgundy), that he and his followers determined to abide there. Many other Germans followed him into Gaul, where he soon collected an army of 120,000 men. The Gallic people turned now for help towards the Romans, and Cæsar demanded an interview with A., who proudly replied, that 'he did not see what Cæsar had to do with Gaul.' After another message from Cæsar had been treated in the same scornful manner, the Roman forces under Cæsar advanced and occupied Vesontium (now

Besançon), the chief city of the Sequani. A furious engagement took place (B.C. 58), in which Roman discipline prevailed over the German forces, which were utterly routed. A., with only a few followers, escaped over the Rhine into his own country. His subsequent history is unknown.

ARISE, v. *ă-rîz'* [AS. *arisan*: Goth. *reisan*: Icel. *risa*, to arise: Ger. *reisen*, to start]: to get up; to come into view; to ascend. ARIS'ING, imp. AROSE, pt. *ă-rôz'*, got up. ARISEN, pp. *ă-rîzn'*, got up; mounted upwards.—SYN. of 'arise': to mount; ascend; climb; scale; proceed; issue; spring; flow; emanate.

ARISPÉ, *ă-ris'pā*: t in Sonora, the extreme n.w. dept. of the Mexican Confederation. It is in the Sierra Madre, the w. range of the Rocky Mountains, on the banks of the Sonora, which is said to lose itself in an inland lake. The surrounding district abounds in the precious metals, as also in cotton, wine, grain, and live stock. Pop. (est.) 7,600.

ARI'STA AND ARIS'TATE: see AWN.

ARISTÆUS, *ăr'is-tē'ūs* [from a Greek word signifying *the best*]: an ancient divinity whose worship in the earliest times was widely diffused throughout Greece, but whose myth is remarkably obscure. According to the common tradition, he was the son of Apollo and Cyrene, the latter the grand-daughter of Peneius, a river-god of Thessaly. She is said to have given birth to A. on the coasts of Libya, in Africa, whence the region is alleged to have derived its name of Cyrenaica. Hermes placed the child under the protection of the Horæ, the fosterers of cities, culture, and education. According to another tradition, A. was the son of the nymph Melissa, who fed the infant with nectar and ambrosia, and afterwards intrusted his education to Chiron. The great diversities in the legend were probably caused by the fusion into one of separate local divinities, whose functions were similar, and whose histories were, in consequence, carelessly commingled. After A. left Libya, he went to Thebes, in Bœotia, where he was taught by the Muses the arts of healing and prophecy, and where he married Autonoe, the daughter of Cadmus, by whom he had several children. After the unfortunate death of his son Actæon (q.v.), he went to Ceos, where he liberated the inhabitants from the miseries of a destructive drought by erecting an altar to Zeus *Icmæus*—i.e., the rain-maker. He now returned to his native land; but shortly after set out a second time on a voyage of beneficence. He visited the islands of the Ægean Sea, Sicily, Sardinia, and Magna Græcia, leaving everywhere traces of his divine benignity. At last he went to Thrace, where he was initiated into the mysteries of Dionysus; and after a brief residence in the vicinity of Mount Hæmus, he disappeared from the earth.

This myth is one of an extremely pleasing character, from the invariable beneficence which is attributed to A. It is less disfigured by anthropopathic errors than most of the



myths of Greek divinities. A. was specially worshipped as the protector of vine and olive plantations, and of hunters and herdsmen. He also trained men to keep bee-hives, and averted the burning heats of the sun from the open fields. Later mythology often identified A. with the higher gods Zeus, Apollo, Dionysus.

ARISTARCH, n. *är'is-tärk* [from *Aristarchus* of Alexandria]: a severe critic.

ARISTARCHUS, *är'is'tär-küs*, OF SAMOS: a celebrated ancient astronomer, of the Alexandrian school, who lived, B.C. 281-264. All his writing have perished, except a short essay on the sizes and distances of the sun and the moon. In this he shows the method of estimating the rela-

tive distances of the sun and the moon from the earth, by the angle formed by the two bodies at the observer's eye at that moment when the moon is exactly half-luminous. It will be obvious from a glance at the annexed figure that the three bodies must then form a right-angled triangle, of which the moon is at the right angle. The angle MES then being observed, it is easy to find the ratio between EM and ES. This is quite correct in theory; but the impossibility of determining when the moon is exactly half-illuminated renders the method useless in practice. Besides, in the days of A. there were no instruments for measuring angles with anything like accuracy. A. estimated the angle at E at  $83^\circ$ , and determined EM to be  $\frac{1}{50}$  of ES; the truth being that the angle at E differs only by a fraction of a minute from a right angle, and that EN, the distance of the moon from the earth, is about  $\frac{1}{400}$  of ES, the distance of the sun. According to some accounts, A. held, with the Pythagorean school, that the earth moves round the sun; but this seems to be a mistake. Vitruvius speaks of A. as the inventor of a kind of concave sun-dial.



ARISTARCHUS, of SAMOTHRACE: a grammarian, who lived abt. B.C. 150 in Alexandria, where he founded a school of grammar and criticism, and educated the children of Ptolemy Philopator. His life was devoted chiefly to the elucidation and restoration of the text of the Greek poets, especially of Homer. The form in which we now have the Homeric poems preserved is in a great measure owing to his judgment and industry. The strictness of his critical principles has made his name a general term for a severely just and judicious critic. Being afflicted with an incurable dropsy, he ended his life by voluntary starvation at the age of 72. The fragments of his writings that have been preserved are to be found scattered through the *Scholia* on Homer, first published by Villoison (Venice, 1788).

ARISTATE, a. *ä-ris tät* [L. *äris'ta*, a beard of corn]: furnished with beards, like barley and many grasses; awned.

ARISTEAS, *ä-ris'tē-äs*: an entirely fabulous character

## ARISTIDES.

who may be styled 'the Wandering Jew' of popular tradition in ancient Greece. First we find A. teaching Homer; then, some ages afterwards, born at Proconnesus, an island in the Sea of Marmora. It is stated that having visited the Arimaspeæ, the gold-watching griffin, and the Hyperboreans, he died on his return home; but, soon afterwards, a traveller asserted that he had been met and accosted by A. Consequently, neighbors searched the house where the body of A. was supposed to be lying, but it could not be found. Seven years afterwards, he appeared as an author, and wrote a poem entitled *Arimaspeia*, in three books, giving accounts of northern and central Asia, which were copied by Herodotus and others. After thus establishing himself as a poet, he vanished again; and after 340 years of mystery reappeared at Metapontum, in the south of Italy, where he advised the people to erect an altar to Apollo, and an altar to 'the everlasting Aristeeas,' assuring them that, when Apollo founded their city, he (A.), in the form of a raven, had accompanied the god, and had assisted in the ceremony. In the early controversy of the Christian Church, heathens sometimes quoted this tale of A. as a counterpart to the miracles recorded in the New Testament.

ARISTIDES, surnamed 'THE JUST': son of Lysimachus, and descended from one of the best families in Athens: d. B.C. 468. He was one of the ten leaders of the Athenians against the Persians at the battle of Marathon (B.C. 490). It had been arranged that each leader (or *strategos*) should hold the supreme command for one day; but A., who saw the folly of this want of unity, induced his companions to give up their claims, and make Miltiades commander-in-chief, which proved the means of winning the battle. In the following year, A. was chief archon, and in this position, as in every other, secured the general respect of the citizens. Some years later, probably because he had opposed the plans of Themistocles, that unscrupulous leader brought about the banishment of A. It is said that when an illiterate citizen, who did not know him personally, requested him to write his own name on the voting shell, he asked the man whether A. had injured him. 'No,' said the voter; 'but I am weary of hearing him always styled "the Just."' A. submitted to the sentence with dignity, praying to the gods, as he left the city, that the Athenians might not have cause to repent of their decision. Only three years later, Xerxes, with an overwhelming force, had invaded Greece. A., hearing that the Greek fleet was surrounded by that of the Persians, hastened from Ægina to apprise Themistocles of the danger, and offer his aid. After taking a prominent part in the battle of Salamis, A. was restored to popular favor, and soon afterwards aided greatly in achieving the victory at Plataea, in which he commanded the Athenians. In B.C. 477, he introduced a change of the constitution, by which all citizens without distinction of rank, were admitted to political offices. As showing the confidence reposed in A., it is related that Themistocles having announced that he had a scheme very



advantageous for Athens, but which he could not disclose in a public assembly, A. was deputed to consult with Themistocles on the subject. The plan was to secure the naval supremacy of Athens by burning all the vessels of the other Greek states, her allies, then lying in a neighboring harbor. A. reported to the people that nothing could be more advantageous than the plan of Themistocles, but nothing could be more unjust; and the matter was immediately rejected by the people. After a variety of other public services, A. died in old age, and universally respected, so poor that it is said his funeral had to be provided for by the public.—He left a son and two daughters, for whom provision was made by state bounty.

ARISTIPPUS, *ăr'is-tīp'pūs*: founder of the Cyrenaic school of philosophy among the Greeks: b. Cyrene, Africa, abt. B.C. 424; son of Aritades, a wealthy gentleman of that city. Having come over to Greece to attend the Olympic games, he heard so much of Socrates, that he was filled with an eager desire to see the sage, and hurried to Athens, where he became one of his pupils. He remained with Socrates up nearly to the last moments of the great teacher, though he does not at any period seem to have followed his doctrines or his practice. We know that subsequently he was the object of strong dislike, both to Plato and to Antisthenes the Stoic. He passed a considerable part of his life in Syracuse, at the court of Dionysius, the tyrant, where he acquired the reputation of a philosophic voluptuary. That his manners must have been at once extremely graceful and accommodating, is clear from the saying of his opponent, Plato, who declared that 'A. was the only man he knew who could wear with equal grace both fine clothes and rags.' Diogenes Laertius records a number of his *dicta*, some of which take the form of *bons-mots* and indicate a sharp, cutting, lively, and self-complacent nature. A. lived also at Corinth, in intimacy with the famous courtesan Laïs, but towards the close of his life he is supposed to have retired to Cyrene. His daughter Arete seems to have been a person of superior abilities, inasmuch as her father imparted his leading doctrines to her, and she to her son, A. the Younger (hence called *Metrodidaktos*, 'taught by the mother'), by whom they are supposed to have been systematized. A. in all probability published nothing during his life. He prided himself more upon spending his days in what he conceived to be a philosophical manner, than in elaborating a philosophical system for the benefit of the race.

The Cyrenaic school, all the teachers of which were probably imbued with the spirit of A., and merely carried out his doctrines to their legitimate results, professed a great contempt for speculative philosophy, and for physical and mathematical knowledge. They confined their investigations to morals, and formed an ethical system completely in harmony with the gay, self-possessed, worldly, and skeptical character of their master. The chief points of the Cyrenaic system were: 1. That all human sensations are either pleasurable or painful, and that pleasure and pain are the only criterions

## ARISTOBULUS—ARISTOCRACY.

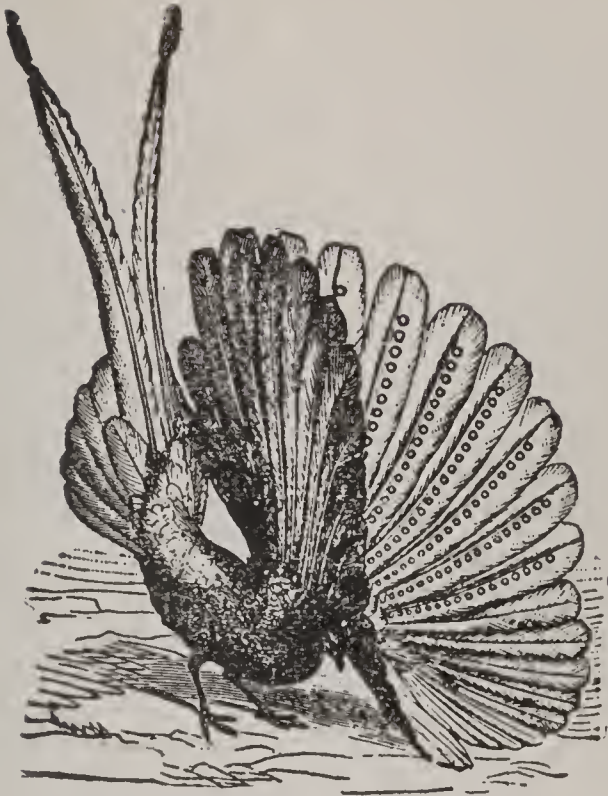
of good and bad. 2. That pleasure consists in a gentle, and pain in a violent, motion of the soul. 3. That happiness is simply the result of a continuous series of pleasurable sensations. 4. That actions are in themselves morally indifferent, and that men are concerned only with their results. Wieland in his historico-philosophical romance, *Aristipp und einige seiner Zeitgenossen* (A. and Some of his Contemporaries), presents us with a charming picture of the life and opinions of the great philosophic sensualist, who stood out in strong relief against the gloom and austerity of Antisthenes and the Cynical school. The doctrine that makes pleasure the chief good is often called *Hedonism*.

**ARISTOBULUS**, *â-rîs'tô-bû'lûs*: an Alexandrian Jew who lived under Ptolemæus Philometer abt. B.C. 175, and was considered by the early Fathers as the founder of the Jewish philosophy in Alexandria. He was long considered the author of the *Exegetical Commentaries on the Books of Moses* which went under his name, but it is now admitted that the work in question was the composition of a later period. Only fragments of it remain. It was intended to show that the oldest Greek writers borrowed from the Hebrew Scriptures; and to support this theory, numerous quotations were professedly taken from Linus, Musæus, Orpheus, etc., of which the Christian apologists made abundant use. These, however, have long been considered forgeries, inasmuch as they do not exhibit a trace of the antique Greek spirit, but make the writers speak in the tone and style of the Old Testament (see Valckenær's treatise). For the Hasmonean or Maccabee prince A., see **JEWS**.

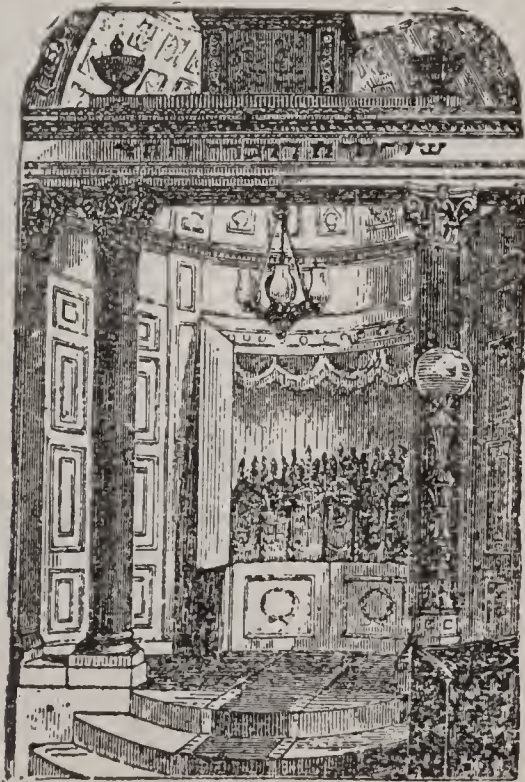
**ARISTOCRACY**, n. *âr'îs-tôk'ră-sî* [Gr. *aris'tokrati'a*, the rule of the best born—from *aristos*, best; *kratos*, rule, strength]: government by nobles; the nobility or chief persons of a country. **ARISTOCRAT**, n. *âr-îs'tô-krăt* or *âr'îs-tô-krăt'*, one who favors an aristocracy; one of the nobles; *familiarly*, a haughty person. **ARISTOCRATIC**, a. *âr'îs-tô-krăt'îk*, or **ARISTOCRAT'ICAL**, a. *-î-kăl*, belonging to the aristocracy; *familiarly*, very dignified; haughty. **ARISTOCRAT'ICALLY**, ad. *-lî*. **ARISTOCRAT'ICALNESS**, n. the quality of being aristocratical. **ARISTOCRATISM**, n. *âr'îs tō-krăt'-îzm*, the principles or habits of aristocrats. **ARISTOCRATIZE'**, v. *-krăt-îz'*, to raise from a lower to a higher level in the social scale, as by education, investing with the franchise, etc.

**ARISTOC'RACY** [Gr. *aristocratia*, from *aristos*, best, and *kratos*, power]: means etymologically the power or government of the best, noblest, or most worthy; and in the sense which it originally bore, A. had reference not to a social class, but to a form of government in which the sovereignty was placed in the hands of a minority of the citizens of the state, exclusive altogether of the slave population, which generally existed in antiquity. It is in this sense also that we use it when we speak of the Italian states of the middle ages as aristocracies. In order to constitute an A., it was further necessary that the minority which composed it should consist of the highest class, in point not of wealth alone, but of





Argus Pheasant. (From Darwin.)



Ark, containing the Rolls of the Law.—Great Synagogue, Aldgate, London

## ARISTOGEITON.

birth and culture; the government of a minority in numbers simply, being known by the more odious name of an *oligarchy*. Were the whole government of England intrusted to the house of lords, even though that body were to become vastly more numerous than it is, so long as it did not include half of the adult males, and were not elective, but hereditary, the country would be ruled by an A., and its rulers would be aristocrats in the antique sense of the term. In this, its political sense, the term A. has never been acclimatized in England, because the thing which it signifies has always been unknown. The territorial nobility, though possessing great influence in the government of the country, has, at every stage of its career, been controlled either by the crown from above or the commons from below; and thus it is that, though more important in social influence than in any other country, the English A. has never assumed the form of a ruling class. When used with reference to English society, the term A. has two significations—a narrower and a wider one. According to the first, it is nearly synonymous with *nobility* (see that title and its relative subdivisions). According to the second, it is synonymous with *gentry*, and includes the whole body of the people, titled and untitled, above a certain very indefinite social line. Perhaps the nearest approximation which we shall make to a definition of A. in this, its proper English sense, will be by adopting that which Aristotle has given, not of *aristocratia*, but of *eugeneia*, or good birth. ‘Good birth,’ he says, ‘is ancient (long-inherited) wealth and virtue.’ (*Politic.* lib. iv. c. 7.) The question as to the extent to which either of these qualities is requisite to constitute a claim to admission into the ranks of the A., is one to which probably not two persons, either within or without the pale, would return the same answer; but that the absence of either would be a ground of exclusion is a point on which there will be little difference of opinion. In England, no amount of mere wealth will, in general, confer it either on a tradesman or his immediate descendants (see GENTLEMAN); and scarcely any deeds, however noble, will give it to him who is not the possessor of inherited fortune. Neither Burns the gauger, nor Shaw the life-guardsmen, has ever been regarded as an aristocrat, though nobody denies that the one was a poet, and the other a hero. But when the claim to recognition as an aristocrat has been inherited, it will scarcely be lost by the individual himself, however adverse may be his worldly circumstances, or however ignoble his conduct; and it is not difficult to imagine an elevation of moral tone which would confer it even on a beggar. In the United States, the claim to A. is scarcely asserted under that term; and the term itself is scarcely used except with some suggestion of opprobrium; though the thing indicated may be claimed or sought for under another name.

**ARISTOGEITON:** see HARMODIUS and ARISTOGEITON.



## ARISTOLOCHIA.

ARISTOLOCHIA, *ă-rîs'tŏ-lŏ'kî-ă*: genus of plants of the natural order *Aristolochiaceæ* or *Asarineæ*. This order, which is dicotyledonous or exogenous, consists of herbaceous plants or shrubs, often climbing shrubs, and contains upwards of 130 known species, chiefly natives of warm climates, and particularly abundant in the tropical regions of S. America. The leaves are alternate, simple, stalked, often with a stipule; the flowers axillary, solitary, hermaphrodite, of a dull color; the perianth at its base adhering to the ovary, tubular, sometimes regular, but generally very irregular; the stamens 6-12, epigynous (or inserted upon the ovary), distinct, or adhering to the style; the ovary is generally six-celled, with numerous ovules; the style simple, the stigmas radiating, as numerous as the cells of the ovary; the fruit dry or succulent; the seeds with a very minute embryo at the base of fleshy albumen.—The genus *A.* is distinguished by a tubular oblique perianth, generally inflated at the base, the mouth dilated on one side, and by stamens adherent to the style, so that it is included in the Linnæan class *Gynandria*. The species are mostly shrubby, and natives of tropical countries, some of them climbing to the summits of the loftiest trees. Several are found in the south of Europe; one only, the common BIRTHWORT (*A. Clematitis*), occurs upon the European continent as far n. as about lat. 50°, and is a doubtful native of England. It is a perennial plant, with erect, naked, striated stem, heart-shaped dark-green leaves on long stalks, the flowers stalked, and growing to the number of sometimes seven together from the axils of the leaves, the tube of the perianth about an inch long, and of a dirty yellow color. It grows chiefly in vineyards, hedges, about the borders of fields, among rubbish, and in waste places. It has a long branching root, with an unpleasant taste and smell, which, with the roots of *A. rotunda* and *A. longa*, two herbaceous species, natives of the south of Europe, was formerly much used in medicine, being regarded as of great service in cases of difficult parturition, whence the English name. These roots possess powerful stimulating properties, and those of the southern species are still used as emmenagogues. The root of *A. Indica* is used in the same way by the Hindoos.—*A. serpentaria*, VIRGINIAN SNAKEROOT, is a native of most parts of the United States, growing in woods. It has a flexuous stem, 8-10 inches high, bearing heart-shaped very acute leaves. The flowers are on stalks, which rise



*Aristolochia Clematitis.*

## ARISTOLOCHIA.

from the root; the orifice of the perianth is triangular. The root has a penetrating resinous smell, and a pungent, bitter taste. It has long been a fancied remedy for the bite of the rattlesnake. It possesses stimulant and tonic properties. It is an article of export from the United States to Europe, and bears a high price, being highly esteemed as a medicine in certain kinds of fever.—Its reputation as a cure for serpent-bites is shared by other species, particularly *A. anguicida* and *A. gua'co* (the Guaco of Colombia), natives of the warmer parts of America. The juice has certainly the power of stupefying, and even of killing, serpents; and it is said that a number of species are used by Egyptian jugglers, in order to their handling serpents with impunity.—Several South American species seem also to possess medicinal properties analogous to those of the Virginian snakeroot.—*A. Siphon*, a climbing shrub, of 15–20 ft. in height, a native of the southern parts of the Alleghany Mountains, is frequently planted in the United States, in Britain, and on the continent of Europe, to form shady bowers. It has very large heart-shaped leaves (a foot in breadth) of a beautiful green. The flowers hang singly, or in pairs, on long stalks; the tube of the perianth is crooked in its upper part, inflated at the base, and veined with reddish-brown veins, having a sort of resemblance to



*Aristolochia Serpentaria*:

*a*, a flower; *b*, a flower not open, showing the parts of fructification  
*c*; *d*, the stamens; *e*, the stigmas.

the bowl of a tobacco-pipe, for which reason the shrub is sometimes called Pipe-shrub, Pipe-vine, or Dutchman's Pipe.—The tropical species are distinguished for their beauty and the peculiar forms of their flowers. Some of them are much prized ornaments of our hot-houses. The genus *ASARUM* also belongs to the order *Aristolochiaceæ*.



## ARISTOPHANES.

ARISTOPHANES, *är'is-tŏf'a-nēz*: the only writer of the old Greek comedy of whom we possess any entire works: b. Athens, abt B.C. 444; son of one Philippus. We know very little of his history. Plato, in his *Symposium*, relates that he was fond of pleasure—a statement which it is easy to credit when we consider the tendencies of his profession in all ages. It seems equally clear, however, from the vigorous and consistent expression of his convictions in his various works, and from the fearless manner in which he assails the political vices of his day, that he was possessed of an honest and independent spirit. He appeared as a comic writer in the fourth year of the Peloponnesian war (B.C. 427). The piece which he produced was entitled *Daitaleis* (the Banqueters), and received the second prize. It ridiculed the follies of extravagance, and like all his subsequent works, was pervaded by a contempt of modern life, and an admiration of the sentiments and manners of the earlier generations. Next year, he wrote the *Babylonians*, in which he satirized Cleon, the so-called demagogue, so sharply, that the latter endeavored to deprive him of the rights of citizenship, by insinuating that he was not a real Athenian. This in all probability gave rise to the various traditions of A. having been born in Rhodes, Egypt, etc. Fragments of these plays remain. In 425, his *Acharnians* obtained the first prize. It was written to expose the madness of the war then waging between Athens and Sparta, and exhibits the feelings of the 'peace-party' in the former city. It is still extant. In 424, appeared *Hippeis*, the *Knights* or *Horsemen*. It was the first which the poet produced in his own name, and evinces the singular boldness of the author. It is levelled against Cleon, and presents us with a striking picture both of a vulgar and insolent charlatan, and of the fickle, cunning, credulous, and rather stupid mob over whom he precariously tyrannizes. It is related of this piece that, when no actor would undertake to play the part of the powerful Cleon, A. himself impersonated the demagogue. Unfortunately for the character of Cleon as well as that of the Athenian democracy, these caricatures and misrepresentations of A. have been received as historical pictures. How far they are from the truth has been clearly shown by Grote in his *History of Greece*. See CLEON. In 423, A. produced the *Clouds*, which and the *Knights* are the two most famous of his comedies. They exhibit in overflowing richness that fancy, wit, humor, satire, and shrewd insight which characterize this greatest of all Greek comic writers. The *Clouds*, however, displays at the same time the weaknesses and limitations of A.'s mind. Its aim was to deride the pretensions of the new sophistical school, and to point out its pernicious tendencies. So far well. But A., who was no philosopher, demonstrates his own incapacity to appreciate the highest range of thought and character, by selecting no less a person than Socrates as the most perfect representative of a sophist. A., who was both religiously and politically conservative, had apparently no clearer conception of abstract truth than is in-

## ARISTOPHANES—ARISTOTELIAN.

volved in reverence for the sanctities of the past, the old gods, old traditions, old manners, and old sentiments. He had an instinctive hatred of innovations, and considered all equally pernicious. As he had represented Cleon the reformer as a vulgar innovator and demagogue, ruled by the lowest considerations, he makes the innovating views of Socrates also proceed from corrupt motives, veiled perhaps with more craft. Alcibiades is caricatured in this brilliant comedy as a wildly extravagant youth, whose career of ruin is accelerated by the insidious instructions of Socrates, and a hint is thrown out towards the end of the piece, which unfortunately proved to be the 'shadow' of a 'coming event.' A. represents the father of Alcibiades as about to burn the philosopher and his whole *phrontisterion* (subtlety-shop); and there can be little doubt that this dramatic vilification of the purest of heathen moralists led to that persecution which, twenty years later, culminated in his condemnation and death. In 422, appeared the *Wasps*, still extant, in which the popular courts of justice are attacked; and three years later, in his *Peace*, he returns to the subject of the Peloponnesian war, which is ridiculed with great cleverness. In 414, he produced two comedies, *Amphiaraus* and the *Birds*, both of which caricature, in the liveliest manner, the Sicilian expedition, then being meditated, but which proved so utter a failure. The *Lysistrata* belongs to the year 411, and exhibits a civil war of the sexes, as the monstrous issue of that in the Peloponnesus. In his *Plutus* and *Ecclesiazusæ*, which appeared in 408 and 392, he assailed the new passion for Doric manners and institutions, and ventured to ridicule Plato, in that, however, in which the philosopher is weakest—namely, his political theory. Euripides, also, as the sophist among poets, is severely handled in the *Frogs*.

A. wrote fifty-four comedies, of which only eleven are extant. He is acknowledged to stand far above all his contemporaries or successors of the middle and new comedy in wealth of fancy and beauty of language. His choruses sometimes exhibit the purest spirit of poetry; and Plato himself says that the soul of A. was a temple for the Graces. The ingenuity which he shows in the mechanical artifices of verse is not less wonderful. Frogs are made to croak choruses, pigs to grunt through a series of iambics, and words are coined of amazing length—the *Ecclesiazusæ* closes with one composed of 170 letters. It only remains to be added, that the personalities in which A. indulged descend at times into coarseness and indecency, and that even the gods whom he undertook to defend are treated with levity, and placed in the most ludicrous lights.

ARISTOPHANIC, a. *ăr'is-tō-făn'ik* [from *Aristoph'anēs* (q.v.)]: shrewd; witty.

ARISTOTELIA: see MAQUI.

ARISTOTELIAN, a. *ăr'is-tō-têl'ĭ-ăn*, or ARISTOTEL'IC, a. [from *Aristotle* (q.v.)]: pertaining to Aristotle or his philosophy: N. a follower of Aristotle's philosophy. ARISTOTELIANISM, n. the Peripatetic system of philosophy founded by Aristotle.



## ARISTOTLE.

ARISTOTLE, *ăr'is-tot-l*: B.C. 384-322; b. at the Grecian colonial town of Stageira, on the w. side of the Strymonic Gulf (now the Gulf of Contessa, in Turkey in Europe). He belonged to a family in which the practice of physic was hereditary. His father, Nikomachus, was the friend and physician of Amyntas II., king of Macedonia, father of Philip, and grandfather of Alexander the Great. A. lost both parents while he was quite young, and was brought up under the care of Proxenus, a citizen of Atarneus, in Asia Minor, who was then settled at Stageira. It is to be conjectured that his education, such as it was, would take the direction of preparing him for the family profession, and that whatever knowledge and power of manipulation attached to the practice of physic at that time would be among his early acquisitions. In after-life, he occupied himself largely in the dissecting of animals, and was acquainted with all the facts that had been derived from this source by others before him. It seems probable, however, that he early abandoned the intention of following physic as a profession, and aspired to that cultivation of universal knowledge for its own sake, in which he attained a distinction without parallel in the history of the human race.

In his 18th year (B.C. 367) he left Stageira for Athens, then the intellectual centre of Greece and of the civilized world. Plato, on whom he doubtless had his eye as his chief instructor, was then absent at Syracuse in that extraordinary episode of his life, connecting him as political adviser with the two successive Syracusan despots—Dionysius the Elder, and Dionysius the Younger—and with Dion. A., therefore, pursued his studies by books, and by the help of any other masters he could find, during the first three years of his stay. On the return of Plato, he became his pupil, and soon made his master aware of the remarkable penetration and reach of his intellect. The expressions said to have been used by Plato imply as much; for we are told that he spoke of A. as the 'Intellect of the School.' Unfortunately, there is a total absence of particulars or precise information as to the early studies of the rising philosopher. He remained at Athens twenty years, during which the only facts recorded, in addition to his studying with Plato, are, that he set up a class of rhetoric, and that, in so doing, he became the rival of the celebrated orator and rhetorical teacher, Isocrates, whom he appears to have attacked with great severity. It was in the schools of rhetoric that the young men of Athens got the principal part of their education for public life. They learned the art of speaking before the *Dikasteries*, or courts of law, and the public assembly, with efficiency and elegance; and incidentally acquired the notions of law and public policy that regulated the management of affairs at the time. We can easily suppose that A. would look with contempt upon the shallowness—in all that regarded thought or subject matter—of the common rhetorical teaching, of which, doubtless, the prevailing excellence would lie in the form of the address, being artistic rather than profound or erudite. One of the disciples of Isocrates, defending his master against A., wrote a treatise

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wherein allusion is made to a work (now lost) on proverbs, the first recorded publication of the philosopher.

The death of Plato (B.C. 347) was the occasion of A.'s departure from Athens. It was not extraordinary or unreasonable that A. should hope to succeed his master as the chief of his school, named the Academy. We now know that no other man then existing had an equal title to that pre-eminence. Plato, however, left his nephew Speusippus as his successor. We may suppose the disappointment thus arising to have been the principal reason for A.'s determination to stay no longer in Athens; but there are other reasons also that may be assigned, arising out of his relations with the Macedonian royal family at a time when the Athenians and Philip had come into open enmity.

Whatever may be the explanation, he went in his 37th year, after a stay of nearly twenty years in Athens, to the Mysian town of Atarneus, in Asia Minor, opposite to the island of Lesbos. Here he lived with Hermeias, the chief of the town, a man of singular energy and ability, who had conquered his dominion for himself from the Persians, at that time masters of nearly all Asia Minor. A. had taught him rhetoric at Athens, and he became in return the attached friend and admirer of his teacher. For three years the two lived together in the stronghold of Atarneus; but by treachery and false promises, the Rhodian Mentor, an officer in the Persian service, got possession of the person of Hermeias, put him to death, and became master of all the places held by him. A. accordingly fled, and took refuge in Mitylene, the chief city of the neighboring island of Lesbos. He also took with him Pythias, the sister of Hermeias, and made her his wife. In a noble ode, he has commemorated the merits of his friend thus lost to him through the treachery of a Greek renegade. His wife, Pythias, died a few years afterwards in Macedonia, leaving him a daughter of the same name. His son, Nikomachus, to whom he dedicated his chief work on ethics—called, in consequence, the *Nikomachean Ethics*—was born to him at a later period of his life by a concubine.

After two years' stay at Mitylene, he was invited (B.C. 342, age 42) by Philip to Macedonia to educate his son Alexander, then in his 14th year. What course of study Alexander was made to go through, we cannot state. He enjoyed the teaching of A. for at least three years, and contracted a strong attachment to his preceptor, which events afterwards converted into bitter enmity. The two parted finally when Alexander commenced his expedition into Asia (B.C. 334), and A. came from Macedonia to Athens, having recommended to the future conqueror, as a companion in his campaigns, the philosopher Callisthenes, whom he educated with Alexander. Now at the age of 50, he entered on the final epoch of his life; he opened a school called the 'Lyceum,' from its proximity to the temple of Apollo Lyceus. From his practice of walking up and down in the garden during his lectures, arose the other name of his school and sect, the *Peripatetic*. It would appear to have been his habit to give a morning lecture to select pupils on



the more abstruse subjects, and one in the evening of a more popular kind to a general audience. He may now be supposed to have composed his principal writings; but unfortunately, there is nothing known of the dates of any of them. This crowning period of his life lasted twelve years. After the death of Alexander, the anti-Macedonian party at Athens obtained ascendancy, and among other consequences, an accusation was prepared against A., the pretext being impiety. With the fate of Socrates before his eyes he chose a timely escape, and in the beginning of B.C. 322 took refuge at Chalcis in Eubœa, where in the autumn he died, aged 62. He had long been afflicted with indigestion, and ultimately sank under this malady.

*The philosophy* of A. differed from that of Plato on many points, especially in the fundamental doctrine termed the Theory of Ideas. The Platonic 'ideas' or 'forms' were conceived as real existences, imparting all that is common to the particular facts or realities, instead of being derived from them by an operation of the mind. Thus, the actual circles of nature derive their mathematical properties from the pre-existing 'idea,' or circle in the abstract; the actual men owe their sameness to the ideal man. A. was opposed to this doctrine throughout, although he always speaks of its author with respect, and sometimes with affection. The whole method of A. was in marked contrast to the Platonic handling of philosophical subjects: he was a most assiduous observer and collector of facts, from which he drew inductions with more or less accuracy. Plato, on the other hand, valued facts merely in criticising the views that he was bent upon demolishing, and not as a means of establishing sound theories.

The writings of A. may be said to have embraced the whole circle of the knowledge of his time. Many of them are lost; those that remain refer principally to the following departments.

Astronomy, Mechanics, Physics, were treated of by him at some length; but here his failure was complete, if we look at his writings from the point of view now acquired. He was the victim of capricious fancies, based upon doctrines common among his contemporaries, accepted by him as principles of reasoning, and conducting him to the most unsound conclusions. His theory of the rotation of the sphere, the necessary perfection of circular motion, of the impossibility of a vacuum, and the like, did more to confuse than to explain the phenomena of nature. Nor can it be said that the time was not ripe for putting these subjects on a rational basis; for he was very shortly followed by a series of men, who both observed and reasoned soundly respecting them, and laid the foundation of their great subsequent progress—namely, Euclid, Apollonius, Archimedes, Eratosthenes, and Hipparchus.

The thirteen books called *Metaphysics* contain much profound thought, but are obscure and defectively arranged; indeed, neither the actual arrangement of the books, nor the title which they bear, can be ascribed to A. himself. The subject to which they are devoted is Ontology—the science of *Ens, quatenus Ens*—which he terms *Philosophia Prima*,

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and sometimes Theology. He distinguishes three branches of theoretical philosophy. 1. Physics—the study of sensible material particular things, each of which differs from every other, and all of which have in themselves the principle of change or motion. 2. Mathematics—that of geometrical and numerical entities, known by general definitions, susceptible neither of change nor of movement, capable of being considered and reasoned upon apart from matter, but not capable of existing apart from matter. 3. The First or Highest Philosophy—which studies the essences of things eternal, unchangeable, and apart from all that change, movement, and differentiation which material embodiment involves.

The Metaphysics, or First Philosophy, does in fact deal with the extreme abstractions or generalities of all sciences. It is a collection, partly of doubts and difficulties, partly of attempted solutions, upon these last refinements of the human mind. It includes many valuable comments on the philosophy of Plato and others anterior to or contemporary with A. The general terms and subtle distinctions which this treatise first brought to view were highly prized throughout the philosophy of the middle ages.

He appears in a very different light in his great work on Animals. He has here amassed a stock of genuine observations, and also introduced a method of classification which continues to this day as the most approved groundwork of zoological classification. In this work we see, perhaps, in the most advantageous light, the two great qualities of his mind, rarely coupled in the same individual—the aptitude for observation, and logical method. The excellence shown in his various writings generally depends upon one or other of these qualities.

His Organon or Logic is his complete development of formal reasoning, and is the basis and nearly the whole substance of syllogistic or scholastic logic. This science he almost entirely created. Mr. Grote observes (*History of Greece*, part ii. chap. lxviii) that ‘what was begun by Socrates, and improved by Plato, was embodied as a part of a comprehensive system of formal logic by the genius of A.; a system which was not only of extraordinary value in reference to the processes and controversies of its time, but which also, having become insensibly worked into the minds of instructed men, has contributed much to form what is correct in the habits of modern thinking. Though it has now been enlarged and recast by some modern authors (especially by Mr. John Stuart Mill in his admirable *System of Logic*) into a structure commensurate with the vast increase of knowledge and extension of positive method belonging to the present day—we must recollect that the distance between the best modern logic and that of A. is hardly so great as that between A. and those who preceded him by a century—Empedocles, Anaxagoras, and the Pythagoreans; and that the movement in advance of these latter commences with Socrates.’

A considerable portion of his writings relate to the Human Mind and Body. In one of these, a short treatise on Memory and Recollection, he gave the first statement of the laws of Association of Ideas.



## ARISTOXENUS—ARITHMETIC.

His treatises on Rhetoric and Poetics were the earliest development of a Philosophy of Criticism, and still continue to be studied. The same remark is applicable to his elaborate disquisitions on Ethics.

Perhaps one of his greatest works is his Politics, based upon a collection made by himself of 158 different constitutions of states; the collection itself being unhappily lost. Here is seen the spirit of the inductive observer, which indeed is no less apparent in the works mentioned in the last paragraph. It is, however, a singular fact, that he gives no evidence of having read the historian Thucydides; and his only reference to Herodotus is on a point of natural history. Yet the narratives and descriptions contained in the works of both these writers are probably of as much value, and as much in point, in a Political Philosophy, as the very best observations made by himself.

The great current distinctions of Matter and Form, Substance and Quality, Actuality and Potentiality, are due to A. See Grote's *Aristotle*, 1872.

**ARISTOXENUS**, *ăr'is-tōks'ē-nūs*, of Tarentum: pupil of Aristotle; one of the oldest writers upon music, lived abt. B.C. 330. He was extraordinarily active and versatile in literary studies, and is said to have composed upwards of 450 treatises on music, history, and philosophy. On the death of Aristotle, he fully expected to be appointed his successor, and is said to have been deeply mortified when Theophrastus was preferred; but this statement is discredited by many. He founded a school of musicians, who were called after him Aristoxeneans, and whose distinguishing characteristic was that they judged of the notes in the diatonic scale exclusively by the ear, while the Pythagoreans determined these mathematically. Except his *Elements of Harmony*, in three books, which we still possess, only a few fragments of his writings survive in later authors.

**ARITHMETIC**, n. *ă-rith'mē-tīk* [Gr. *arithmēt'ikē*: L. *arithmēt'ica*, arithmetic—from Gr. *arith'mos*, number: F. *arithmétique*]: the science of numbers; the art of counting or computing. **ARITHMETICAL**, a. *ăr'ith-mēt'ī-kāl*, pertaining to arithmetic. **ARITHMETICALLY**, ad. *-kāl-ī*. **ARITHMETICIAN**, n. *ă-rith'mē-tīsh'ăn*, one skilled in arithmetic. **ARITHMANCY**, n. *ăr'ith măn'si* [Gr. *manteia*, divination]. divination by numbers. **ARITHMOMETER**, n. *-ē-tēr* [Gr. *metron*, a measure]: an abacus.

**ARITHMETIC**: the science that treats of numbers. It is sometimes divided into theoretical and practical; the former investigating the properties of numbers and their combinations, the latter applying the principles so established, in the form of rules, to actual calculations. Some restrict the term A. to this art of reckoning, assigning the investigation of the principles to analysis.

Among the ancient Greeks and Romans, A. made little progress, owing to their clumsy modes of notation. Few of their writings on the subject have come down to us; the most important are those of Euclid (7-10 B. of the *Elements*), Archimedes, Diophantus, and Nicomachus. After the introduction of the decimal system and the

## ARITHMETICAL SIGNS.

Arabic or Hindu numerals (see NUMERALS), about the 11th c., A. began to assume a new form; but it was not till the 16th c. that the Double Rule of Three, or Compound Proportion, was discovered, and decimal fractions were introduced. The invention of Logarithms in the 17th c. is the last great step in advance that the art has made. Passing over the elementary operations of Addition, etc., see the chief titles, such as FRACTIONS: DECIMALS: PROPORTION: LOGARITHMS: etc.

**ARITHMETICAL COMPLEMENT:** that which a number wants to make it reach the next highest decimal denomination. Thus the A. C. of 4 is 6, for  $4 + 6 = 10$ , and that of 642 is 358, because  $642 + 358 = 1,000$ . The A. C. of a logarithm is what it wants to make it reach 10.

**ARITHMETICAL MEAN:** that number that lies equally distant between two others: thus, the A. M. between 11 and 17 is 14, which is found by taking half their sum.

**ARITHMETICAL PROGRESSION:** a series of numbers that increase or diminish by a common difference, as 7, 10, 13, 16, 19, 22; or  $12, 10\frac{1}{2}, 9, 7\frac{1}{2}, 6$ . To find the sum of such a series, multiply the sum of the first and last terms by half the number of terms. The series of natural numbers, 1, 2, 3, 4, etc., form an A. P., of which the difference is 1.

**ARITHMETICAL PROPORTION:** the relation existing between four numbers, of which the first is as much greater or less than the second, as the third is than the fourth; the equality of two differences or arithmetical ratios. In such cases the sum of the extremes is equal to that of the means. Thus 6 and 4, 21 and 19, are in arithmetical proportion; for 4 differs from 6 by 2, as does 19 from 21; the sum of the extremes,  $6 + 19 = 25$ , is consequently equal to that of the means,  $4 + 21 = 25$ . It is not the same as the 'Rule of Three,' in which the members are in geometrical proportion. **ARITHMETICAL PROPORTIONALS,** numbers so related to each other (opposed to *geometric proportionals*).

**ARITHMETICAL RATIO:** the difference between any two numbers constituting part of a series in arithmetical progression.

**ARITHMETICAL RELATION:** comparison together of numbers in an arithmetical progression with the view of ascertaining how much they differ from each other.

**ARITHMETICAL SIGNS:** arbitrary marks or symbols used to denote the operations to be performed on numbers, or the relations existing between them; e. g.,  $7 + 5$  indicates that 7 and 5 are to be *added* together;  $7 - 5$ , that 5 is to be *subtracted* from 7;  $7^5$  that 7 is to be raised to the fifth *power*;  $7 \div 5 = 15 - 3$ , that when 7 and 5 are added together, the result is *equal* to the difference between 15 and 3. The sign  $\times$  in  $8 \times 4$  means that 8 is to be multiplied by 4; the sign  $\div$  in  $8 \div 4$  means that 8 is to be divided by 4. Mostly the same signs are used in Algebra also.



## ARIUS.

ARIUS: *a-rī'us*, or *ā'rĭ-ŭs*: the celebrated founder of Arianism; b. Libya; and as is supposed shortly after the middle of the 3d c. About 306, Alexandria was thrown into confusion by the violence of its religious disputes, and in these A. was largely active. At first, he took part with Meletius, Bishop of Lycopolis, in Upper Egypt, a man who was strenuously opposed to certain notions of discipline entertained by Peter, Bishop of Alexandria; but afterwards he became reconciled to the latter, who made A. a deacon. The reconciliation, however, was brief. A. once more took the part of Meletius, and was excommunicated by Peter in consequence; but the latter dying soon after, Achillas, his successor, restored A. to his office, and even advanced him to the dignity of presbyter, 313. His new function required that he should interpret the Scriptures, and as he possessed an abundance of natural gifts, united with great learning, his preaching became popular, and his peculiarities of opinion were vehemently embraced. The first time, however, that A. was brought into collision on a point of doctrine with his ecclesiastical superiors was in 318. Alexander, Bishop of Alexandria, successor of Achillas, having in a public assembly of clergy, while speaking of the Trinity, said that it contained one single essence, or indivisible unity of substance, A. alleged that such a conception was impossible to the human mind, and accused Alexander of Sabellianism—i. e., of destroying the distinction of persons. The dispute grew hot, and a conference which was held to settle it only embittered the disputants. In maintaining his ground, A. went beyond his first statement of the absolute distinctness of person between the Father and the Son; he maintained that the Son was not co-equal or co-eternal with the Father, but only the first and highest of all finite beings, created out of nothing by an act of God's free will, and that he ought not to be ranked with the Father.

A. was successful in securing the adherence of large numbers both of the clergy and laity in Egypt, Syria, and Asia Minor. In 321, a synod of bishops was held at Alexandria. These deposed and excommunicated A., and active measures were taken to let this decision be known over all the Christian churches; Alexander himself wrote numerous letters (two of which are still extant), exhorting the bishops not to receive the 'heretic.' In consequence of these violent steps, the breach was widened. To escape persecution, A. retired to Palestine, where he wrote a letter to his friend Eusebius, who was Bishop of Nicomedeia, a city of Bithynia, and not far from Constantinople. Eusebius, one of the most influential Christians of his time, warmly sympathized with him; wrote in his behalf to Paulinus, Bishop of Tyre, and others; absolved him from the Alexandrian synod's excommunication; and in 323 convened another synod in Bithynia, which pronounced favorably on A. He even enlisted Constantine on the side of the latter, to this extent at least, that the half-pagan emperor addressed ad

monitions to both Alexander and A., assuring them that the point in dispute was a trifling one, and ought not to provoke a serious quarrel. While A. was residing at Nicomedeia, he wrote a theological work in verse and prose, called *Thaleia*, some fragments of which remain, and indicate an earnest and philosophic mind, but contain expressions which could not but pain a believer in the proper divinity of Christ. The *Thaleia* is said to have been sung by the Arian neophytes, who thus kindled the passions of their adversaries, and increased the virulence of the contest. The comedians, who were pagans, took advantage of the occasion to ridicule the Christian religion in the theatres. The officers of the emperor in several cities wished to repress this profane temerity, but the interference only created greater confusion.

It now became impossible for the emperor to remain neutral or indifferent, with safety to himself or to the tranquillity of the empire. Hosius, Bishop of Corduba, whom he had appointed mediator betwixt Alexander and A., took part with the former, and reported unfavorably of A. The result was, that Constantine, in order, as he thought, to effect a final settlement of the question, convoked the memorable Council of Nicæa (Nice, q.v.), in Bithynia, 325. Three hundred and eighteen bishops from almost all the Christian world, especially from the East, were present, besides numbers of priests, deacons, and acolytes. A. boldly expounded and defended his opinions. He declared in the most unambiguous manner that the Son of God was created out of nothing; that he had not always existed; that he was not immutable or impeccable; that it was through his free-will he remained good and holy; that if he had chosen, he could as easily have sinned as not; in a word, that he was a mere creature and work of the Deity. He further affirmed that the Son of God was not of the same substance, with the Father; that he was not the 'Word' or 'Wisdom,' properly speaking; and that the Scriptures only attribute these names to him as they do to other created intelligences. These propositions were listened to with great calmness by the bishops, but the inferior clergy, or at least a majority of them, manifested the most violent opposition. The document containing his confession of faith was torn to pieces before his face. Arguments, however, of a more rational kind were also employed. Alexander was ably seconded by the young deacon, Athanasius, the equal of A. in eloquence, and in the power of his logic. It was principally by the reasonings of Athanasius that the council was persuaded to define, in the most precise manner, as the doctrine of the Godhead, the absolute unity of the divine essence, and the absolute equality of the three persons. All the bishops subscribed it except two, Theonas of Marmarica and Secundus of Ptolemais, who had the heroism (for it must be considered such) to follow the banished A. into Illyricum.

An imperial edict was now issued commanding the writings of A. to be burned, and threatening with capital punish-



ment all who should be convicted of concealing them. This change in the emperor's sentiments as to the importance of the doctrine at issue is attributed by some writers to his recognizing the will of Heaven in the harmonious consent of so many bishops. A more probable explanation is, that he anticipated the utmost social confusion from the collision of opinion, and resolved to crush that which was at once the youngest and the weakest, hoping thereby to remove the ground of disturbance. He misjudged, however. At Alexandria, the Arians continued in a state of open insurrection, and began to league themselves with other condemned sects, for mutual defense. The great influence of Eusebius was also exerted on behalf of the exiled heretic, as well as that of Constantia, the sister of the emperor, who had herself embraced Arian tenets, and in 328 permission was granted him to return from Illyricum. Constantine was very gracious, perhaps because he thought the chances of peace being restored to the community were now greater, for it had been represented to him by Eusebius that the doctrines of A. did not essentially differ from those of the Nicene Council. In 330, A. had an interview with the emperor, and succeeded in convincing him that Eusebius had spoken the truth. In the confession of faith which he presented, he declared his belief that the Son was born of the Father before all ages, and that as the 'Word,' he had made all things both in heaven and earth. The emperor was satisfied, and sent orders to Athanasius, now Bishop of Alexandria, to receive A. into the communion of the church. This Athanasius refused to do, and a series of tumults was the consequence. Eusebius was greatly irritated. He called a synod of bishops at Tyre, 335, which proceeded to depose Athanasius. The emperor was even prevailed on to remove the latter to Gaul, though he alleged as his reason, that he wished to deliver him from the machinations of his enemies. In the same year, another synod met at Jerusalem, which revoked the sentence of excommunication uttered against Arius and his friends. Still the majority of the Christians of Alexandria clung to the doctrines of Athanasius, and resolutely resisted every effort to establish the new opinions among them. Disappointed in his expectations, Arius in 336 proceeded to Constantinople, where he presented the emperor with another apparently orthodox confession of faith; whereupon orders were issued to Alexander, Bishop of Constantinople, to administer to Arius the holy communion on the Sunday following. This was considered a grand triumph by Eusebius and his friends, and when the day arrived, they escorted A., as a guard of honor, through the streets of the metropolis. When about to enter the temple, in which it was intended that he should be received with solemn pomp, he retired a moment to relieve nature, but fainted, and died of a violent hemorrhage. His disciples declared that he had been poisoned, while the orthodox devoutly affirmed that God had answered the prayers of Alexander.

A. was exceedingly handsome, but the harassing cares of a life spent in a continual struggle with his adversaries are

said to have given him a worn and haggard look. His manners were graceful and modest; he was noted for even an ascetic abstinence, and the purity of his moral character was never challenged.

After the death of A., his followers rallied round Eusebius, now Bishop of Constantinople (338), from whom they were styled Eusebians. The reconciliatory middle party of Eusebius of Cæsarea (died 340), who wished to end the great controversy by abstaining from all strict dogmatic assertions on the matter, soon dwindled into insignificance between the two contending parties. Constans, who ruled the West after the death of Constantine (337), and Constantius, in the East, made an essay towards reconciliation; but it failed at the synod of Sardeis (347), where the occidental bishops gathered themselves round Athanasius in support of the *Homoousian* doctrine (identity or *sameness of substance*), while in a separate council at Philippopolis, the oriental bishops asserted the *Homoiousian* doctrine (implying merely *similarity of substance*). Slight as might appear the verbal difference between the two parties, the bitterness of the controversy was intense, and pervaded almost all departments of public and private life. Constantius having, by the death of Constans (350) and conquest over Magnentius (353), gained dominion over the West, the Arian cause, which he favored, triumphed at the synod of Arelate or Arles (353) and at that of Milan (355). The Nicene doctrine had still strong support on its side, and was strictly maintained by the banished Athanasius and his friends, while the Antiniceans, soon after their triumph, were divided into at least three parties. The old Arians, also styled Anomœoi, or Heterousians, asserted, in the boldest style, their doctrine of ‘distinct substances.’ The semi-Arians (a large majority in the Eastern Church) maintained the Homoiousian doctrine of similar substances. A third party held the same doctrine with some qualification. Morally, the victory was leaning to the side of the Nicæans. Julian the Apostate (361–363), in his hatred of the Christian religion, left all parties at liberty to contend as they pleased with one another, so that they did not interfere with his plans. Jovianus and his followers in the West, Valentinianus I., Gratianus, and Valentinianus II., extended full toleration to both parties. Arianism, at last, was virtually abolished in the Roman empire, under Theodosius in the East (379–395), and Valentinianus II. in the West. Among the German nations, however, it continued to spread through missionary efforts. Bishop Ulfilas, the translator of the Bible into the Mæso-Gothic language, had been the means of converting the West Goths to Arian Christianity as early as 348; and they adhered to it until the synod of Toledo in 589. The East Goths, Vandals, Burgundians, the Suevi in Spain, and the Longobards also adopted Arianism; but in all these instances the Nicene doctrine ultimately prevailed, most slowly among the Longobards, who retained the Arian creed until 662. Pure Arianism can hardly now be said to exist. It has gradually lapsed into Unitarianism. See UNITARIANS.



## ARIZONA.

ARIZONA, *ăr-ř-zō'nă*: one of the territories of the United States, in the s.w. part, separated from the Pacific by s. California and by the rocky and arid desert of Lower California. It lies between the parallels of  $31^{\circ} 20'$  and  $37^{\circ}$  n. and the meridians of  $109^{\circ}$  and  $114^{\circ} 35'$  w. Its latest computed area according to land office reports is 113,916 sq. m., or 72,906,240 acres. It has been only partially surveyed, however, and its area is believed to be much greater than this, roughly computed at about that of New England, New York, and New Jersey. A. is bounded on the n. by Utah, the 37th parallel forming its n. boundary as far w. as the 114th meridian. From the 36th parallel s., the w. boundary is irregular, following the course of the Colorado river. The s. boundary runs w. along the parallel of  $31^{\circ} 20'$  to the 111th meridian, and then n.w. to  $32^{\circ} 30'$ , where it strikes the Colorado. A. is bounded on the e. by New Mexico. A. occupies a large part of the plateau region, the s. continuation of the Great Basin mountain ranges, and a portion of the group of ranges of which those on the s. coast of California are members. The prevalent character of the surface is arid, and in the s.w. portion are large tracts of shifting sands. The highest known mountain elevation is Mount San Francisco, at the northernmost end of the plateau of that name, and whose summit is 12,700 ft. above the level of the sea. But although the general appearance of the surface of the country is mountainous and forbidding, the variety being desert spaces, *mesas*, or table-lands, void of water, yet there are many valleys of great natural beauty and fertility; the valleys of the Colorado Chiquito and Rio Salinas being true garden-spots, while in the surrounding mountains are excellent stock-ranges, with fine grazing and plenty of water. Even the table-lands, when properly irrigated, prove wonderfully productive, yielding 65 bush. of wheat of fine quality to the acre, and producing Indian corn and root-crops in enormous quantities. The water-ways of A. are the Colorado and Gila rivers, with their tributaries. Here the bottom-lands are fertile, but the valley below the cañons is barren and unproductive. The n. section of the territory is well wooded and fertile, the grass is inexhaustible, and water is accessible; here, too, are the invaluable mining districts. S.e. Arizona lacks both water and timber. The n.w. portion is well timbered with juniper and pine, and there are numerous large springs and lakes. The face of the country in the extreme n.e. presents a succession of mountain ranges and valleys, the hills being covered with forests of yellow pine. Here, however, as in so many parts of A., is great scarcity of water. The most remarkable feature of the topography of this territory is the tendency of its rivers and streams to form cañons of vast depth with precipitous sides. It seems as though these waters had been endowed with a force elsewhere unknown, to enable them to cut their way to the Gulf of California through such gigantic mountainous masses of rock. The entire territory is drained by the Colorado and its tributaries, with the result of the arid condition of the interior. Many of these tribu

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taries are themselves considerable streams, rushing each through its own gloomy and cavernous cañons; but the majestic Colorado is the monarch of them all. This tremendous and swift river, increased by the waters of nearly 200 streams, large and small, covers a descent of more than 3,000 ft. in 600 m. The Great Cañon of the Colorado is one of the natural wonders of the world, whose secrets were never disclosed until the memorable and fatal expeditions of Maj. J. W. Powell, 1869 and 1871, made them known to the world. Through its whole course there is a succession of cañons, which give this river an aspect possessed by no other in the world. At irregular intervals the rapid current plunges down steep declivities a distance of from 75 to 350 ft. The walls of the Grand Cañon are at some points more than a mile in height, dark gorges where the sun never penetrates except for a few moments at high noon. The vast, frowning masses of rock display the most wonderful freaks of nature, being battlemented, scarped, castellated, and pinnaced, after a fashion most grand and impressive. From the termination of the Grand Cañon the Colorado is navigable, though with difficulty, owing to the numerous rapids, to its mouth, a distance of 612 m. The deep cañons of the principal rivers render enormous tracts of land unfit for anything except grazing, and even that with difficulty, owing to the extreme scarcity of water at any distance inland.

*Geology.*—The exploration of the geological and mineralogical conditions of A. have been confined mainly to the portion of the territory just described. It is estimated that the Colorado river has cut through strata representing a thickness of 25,000 ft., nearly five m. of vertical height, exposing in its course every geological formation found in North America, from the quaternary alluvial deposits to the primary azoic rocks, with intervals showing the alterations effected by volcanic action. About 16,000 ft. of these strata are in A., displaying the superficial deposits, alluvium, possibly diluvium, clay, and sandstone detritus, etc. In the n.e. part of the territory are coal-beds, anthracite, and excellent in quality. There are also marbles and sandstones of all colors, granites, and other valuable building-stones. The mineral wealth of A. is great, in veins and placers of gold, silver, copper, and lead, and carbonates and oxides of iron, platinum, and quicksilver, widely distributed. Gold is found free in both placers and quartz lodes; silver in galena, and combined with lead, and copper as sulphides and carbonates; copper is found in the form of gray sulphurets; quicksilver in the form of cinnabar and possibly other combinations; tin, platinum, and nickel, nearly pure; iron ores of all kinds, and well situated for producing the finer qualities of iron and steel. Besides the anthracite coal in the n.e., there is bituminous coal adapted to smelting purposes, at Camp Apache and elsewhere. Immense deposits of salt of the purest quality have been found, and there are large beds of sulphur, gypsum, hydraulic lime, valuable mineral springs, natural lodestones of great magnetic power, and fossil woods of many varieties. There are also opal



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pebbles; garnets, red, white, and yellow; azurite, malachite, chalcedony, sapphires, opals, and possibly some diamonds. The plains appear to be altogether of quaternary and tertiary deposits. In the Colorado valley the sedimentary strata consists of quaternary and tertiary gravels and conglomerates, varied in a few localities with white infusorial earth. The bottom-lands consist of calcareous sands and clays. A section of the Grand Cañon shows the following order: Upper carboniferous limestone; cross-stratified sandstone; red calcareous sandstone with gypsum; lower carboniferous limestone; limestones, shales and grits—Devonian; limestones, mud rocks, and sandstones—Silurian; Potsdam sandstone, granite.

*Botany.*—The vegetation of s. and w. A. is scanty, limited to a few genera, such as cactus, aloë, artemisia, iron-wood, and mesquite. In the middle and n.e. the vegetation is more generous, including rich grasses, pine, and cedar forests; and in the river-bottoms ash, walnut, cherry, willow, cottonwood, and on some of the mountains oak. Wherever the land can be irrigated, it is found that a full growth may be obtained of Indian corn, wheat, barley, oats, grapes, figs, oranges, lemons, sweet potatoes, tomatoes, tobacco, and the castor-bean. In the valleys of middle and e. Arizona there are broad sections of arable land, where all the cereals and root-crops of the n. Atlantic states can be grown, while this region is unsurpassed as grazing land; a thick growth of gramma and bunch grass extends all over it.—The climate of A. varies in the different parts. In the central portion snow falls but does not lie. In s. A. the temperature ranges between 34° and 118° F. The atmosphere is dry, and this region is not subject to malarial disorders; the average rainfall is between 3 and 8 inches. The climate of A. is recommended by physicians as beneficial to constitutions impoverished by bronchial or lung diseases. The temperature in summer rarely exceeds 90°, and in winter generally remains above zero. The largest quantity of rain falls in July and August.

*Zoology.*—Wild animals are not numerous in A. There are two species of deer, the Rocky Mountain antelope, the bighorn, or mountain sheep, and the Rocky Mountain goat. The black and cinnamon bears are somewhat numerous; the puma or cougar is found in the forests, and the jaguar in the lowlands; there are also occasional instances of the finding of the ocelot, the wild-cat, and the lynx, as well as the gray wolf, and one or two species of fox; the prairie wolf, or coyote, does not exist in the territory, but there are peccaries, raccoons, opossum, skunks, and the gopher, or prairie-dog. Large herds of mustangs, or wild horses, are said to roam over the plains of s. A. There are large numbers of birds, 183 distinct species having been sent to the Smithsonian Institution by the Wheeler expedition. Game birds include pheasants, partridges, quails, and grouse, the sage-hen, and prairie-hen. Eagles, vultures, buzzards, and owls are numerous, and here is found—the only place in North America—the king vulture, little inferior in size to the condor, or lam-

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mergeier of the Andes. There are many varieties of fish, some of them peculiar to the territory. The reptiles and serpents are formidable, and in some parts very numerous. In the Gila and Lower Colorado, alligators are found; horned toads, lizards, scorpions, and centipedes flourish in the chapparal and among the cacti; and the table-lands offer a home to large numbers of rattlesnakes. Strangely the skunk is here found dangerous, from its carnivorous propensities, attacking the exposed limbs and features of sleepers, the bite being not only savage, but said to produce a condition similar to hydrophobia.

*Agriculture.*—In 1880 the farm lands covered 135,573 acres (of which 56,071 were improved); comprised 767 farms, valued, with fences and buildings, at \$1,127,946; contained implements and machinery valued at \$88,811; had live-stock valued at \$1,167,989; and yielded products valued at \$614,327.—In 1890 the principal cereal productions were: barley 252,992 bushels, from 16,644 acres; corn 82,535 bushels, 4,331 acres; oats 33,996 bushels, 1,472 acres; and wheat 100,328 bushels, 6,225 acres. In 1902 the corn crop was 151,540 bushels; wheat, 350,700 bushels.—1903, Jan. 1, the farm and ranch animals comprised: horses, 111,001, value \$2,606,176; mules, 3,738, value \$162,807; milch cows, 18,486, value \$694,704; oxen and other cattle, 551,328, value \$9,129,446; sheep, 1,099,180, value \$2,794,334; and swine, 16,112, value \$121,323—total head, 1,799,845, value \$15,508,790.—In the 10 counties, Apache, Cochise, Coconino, Gila, Graham, Mohave, Maricopa, Pima, Yavapai, and Yuma, there were (1892) 512 m. of irrigating canals and laterals, by which 343,000 acres have been reclaimed, and 1,730,000 may be reclaimed under the present water development; and in the whole territory it is believed that fully one-third of the area, or about 24,000,000 acres, could be reclaimed with sufficient capital and adequate storage facilities. The agricultural experiment station, with headquarters at the Univ. of A., is doing invaluable work for the agricultural development of the territory by the various investigations it is conducting.

*Mining.*—Gold and silver mining was prosecuted by the Spaniards and Mexicans long before the country came into the possession of the United States, and some mines were exceedingly productive, including the Cerro Colorado, Mowry, Santa Rita, Salero, Cahuabi, San Pedro, and the celebrated quicksilver mine of La Paz. All the explored portion of A. below the 36th parallel has been divided into mining districts, the most numerous lying in the s.e., including the Dos Cabezas district, Sierra Bonita, Dragoon Range, Globe, Tombstone, Huachuca, Patagonia, Washington, Harshaw, and Santa Rita.—The mineral product of A. 1901 was: copper 130,778,611 lbs.; gold \$4,083,000; and silver \$1,687,440, a considerable increase in copper and silver, and a decrease in gold in a year. The most valuable copper mines were in Cochise, Gila, Yavapai, and Graham cos.; gold, Yuma, Yavapai, and Pima.



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though there was a little production in every mining co. in the territory. Continued prospecting, extension of railroads, and opening of new stage routes are daily increasing the development of the natural resources of the territory. Large deposits of onyx, of a quality declared first-class by competent experts, have been discovered in various localities, and the quantity bids fair to be large. Coconino co. is developing a first-class building sandstone, and Yavapai co. a large and valuable deposit of red and gray sandstone. The development and exportation of building stone is expected to increase largely because of the recent act of congress authorizing the location and titling of land containing building stone.

*Commerce.*—During 1902 the total value of foreign commodities imported into A. was \$9,641,694, of which \$2,744,543 were non-dutiable. The revenue collections aggregated \$49,998; almost the entire revenue of the district was derived from the duty on lead and copper contained in silver ore imported from Mexico. The ore importations included gold \$6,152 oz., value 126,134; silver 1,501,822 oz., value \$1,327,874; lead 2,284,459 lbs., value \$65,814; and copper 266,885 lbs., value \$13,349—total value of ores \$1,533,171; aggregate value of gold and silver bullion and coin imports \$1,228,737.

*Railroads.*—The railroad system of A. shows the following development: (1850) 183 m.; (1860) 743; (1870) 1,157; (1880) 1,843; (1890) 3,422.20; (1892) 3,596.47.

*Education.*—The common-school system is firmly established on a carefully constructed code. The school age, which was formerly from 6 to 24 years, is (1893) from 6 to 18 years, and all children between these ages, excepting Chinese and the children of Indians not taxed, are entitled to admission and free education; and if unable to procure text-books, they are furnished them by the district. Each district, under recent laws, must maintain a school for five months each year, to secure its proportion of county moneys. The general school fund is derived from a direct tax on all property of each county at a minimum rate of 75 cts. per \$100 of assessed property; also from per capita tax, gamblers' and liquor licenses, fines, forfeitures, penalties, etc.; and the fund is proportioned for the use of districts according to the number of children therein, as ascertained by annual census. The school buildings are ample, comfortable, and adequately furnished. Fully one-third of the children of school age are enrolled in the public schools, and nearly one-half attend at least a portion of the year. The grammar-school course is so graded that its completion meets the requirements for admission to the Territorial Normal School at Tempe, which, with the Univ. of A., provides a complete system of public school education.

*Archæology.*—Evidences exist all over A. that a very large population once occupied this part of America. Ruins of extensive buildings and large towns can be found in every valley of southern A., and ancient waterways line every agricultural section. Modern irrigators have

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surveyed ancient canals and found them to run under eruptive lava. Authorities differ as to the cause of the extermination of the cliff and cave dwellers and the residents of the once populous communities—whether by earthquake, epidemic, or warfare; but there are everywhere evidences of a hasty departure of former occupants, and there is much similarity between the pottery and utensils of the present natives and those of the people who are gone. The oldest Indians living say that their traditions tell them that these ruins were there when their people came. It is interesting to note that the general govt. has taken steps to preserve some of the most notable ruins, especially those of Casa Grande; and Gov. Murphy urged (1892) the appointment by the govt. of an ethnological commission, believing that startling discoveries can and will be made in that region affecting the history of the human race. It is interesting to note that a party of Mexican laborers, digging in the extension of the Santa Cruz canal in 1892, Mar., discovered one of the strangest of the old Aztec cities, about 20 ft. below the surface of the ground. The largest building was a triangular structure 300 x 200 ft., and in it were 18 bodies, all of medium size, and mummified. The territorial exhibit at the Columbian World's Exposition included the largest relief map ever made, showing in detail all the pre-historic views of the valleys of the Salt and Gila rivers, and giving a bird's-eye view of nearly 1,000 sq. m., which it is estimated once supported a population of 2,000,000 to 3,000,000 people who have passed into oblivion without leaving a tradition as to whence they came, or when and why they disappeared. This map was prepared under the direction of Prof. F. W. Putnam, of Harvard University.

*Finances and Banking.*—The assessed taxable property of the territory, 1901, aggregated \$38,853,831, the largest items being, railroad property \$6,038,893.41; cattle \$5,038,207; improved farm lands \$4,748,962.43; city and town lots \$2,266,883.50; and improvements thereon \$2,453,068.20. The rate of taxation differed in each co., the average for all purposes being \$1.17 per \$100 valuation, 80 cts. of which was for territorial purposes solely. The territorial indebtedness, bonded and floating, including interest, was \$2,787,349.99; less co., city, and school district debts, \$1,634,027.57; net terr. debt \$1,153,320.42. In 1902, Sept., there were 8 national banks (cap. \$480,000); 5 incorporated banks (cap. \$275,200); 4 private banks, and 16 state banks (cap. \$500,300).

*History.*—The first modern exploration of A. known to history was by the Spaniards. As early as 1526, Don José de Vasconcellos crossed it in the direction of the Grand Cañon, and later it was visited by other Spanish explorers, evidences of whose settlements are still found. But long before this A. is known to have been the seat of an extensive and civilized race, whose remains exist on the Colorado plateau and in the Gila basin, comprising the walls of considerable structures, built of solid masonry, quantities of finely made and ornamented pottery, ruins of care-



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fully constructed fortifications, evidences sufficient to give basis for the estimate that at least 100,000 people occupied the valley of the Gila alone. Ruins of old arastras, or smelting works, show that silver mining was practiced by the ancient races, and occasionally the bones of human beings are brought to light, surrounded by the implements and appurtenances of domestic life. That the Moquis are descendants of one of these ancient races is assumed from their dwellings, some of which date back in their construction to a high antiquity. The Moquis live in the n.e. part of the territory, in the ancient province of Tusayan. They are pagans by religion, and many of their prayers and invocations indicate conditions of the highest antiquity. Their dwellings are of stone, usually placed on some elevation, and three or four stories in height. There are more than 60 towns discoverable, of buildings of this character, only seven or eight of which are now occupied.—The history of A. as a territory of the United States begins in 1848, when, by the treaty of Guadalupe Hidalgo, the territory of New Mexico was ceded by the Mexicans to this country, including that portion of A. lying n. of the Gila river. The portion lying s. of that river was acquired 1853, Dec. 30, by what is known as the "Gadsden purchase" from Mexico, for \$10,000,000. An act of congress passed 1863, Feb. 24, gave this land a political status as the territory of A.

*Government.*—The executive authority, according to acts of congress under which all the territories were organized, is vested in a gov., appointed by the pres. for a term of 4 years, salary \$3,500 per annum; the legislative in a legislature comprising (1893) a council of 12 members and a house of 24, all members elected by the people; and the judicial in a supreme court consisting of a chief-justice and three assoc. justices, appointed by the pres., a dist. court, and the usual court officers. The gov. is assisted by a territorial sec., treas., auditor, adjt.gen., supt. of public instruction, and atty.gen.—The successive gov.s., with their terms of service, are as follows: John A. Gurley 1862-3; John N. Goodwin 1863-66; Richard C. McCormick 1866-69; A. P. K. Safford 1869-76; Charles E. D. French 1876-7; John P. Hoyt 1877-8; John C. Fremont 1878-82; Frederick A. Tritle 1882-85; C. Meyer Zulick 1885-89; Louis Wolfley 1889-91; John N. Irwin 1891-2; Nathan O. Murphy, 1892-4; Louis C. Hughes 1894-6; Benjamin J. Franklin 1896-7; Myron H. McCord, 1897-9; Nathan O. Murphy, 1899-1902; Alex. O. Brodie, 1902-6.

*Counties, Cities, and Towns.*—In 1890 the 10 cos. had pop., Pima 12,673; Maricopa 10,986; Yavapai 8,685; (Coconino co. was organized from part of Yavapai in 1891;) Cochise 6,938; Graham 5,670; Apache 4,281; Pinal 4,251; Yuma 2,671; Gila 2,021; and Mohave 1,444. In 1903 there were 13 cos., the new ones being Coconino, Navajo, and Santa Cruz, and the most populous, Maricopa, 10,366; Navajo 8,817; Graham, 8,492; Coconino 5,344; Yavapai 5,114; Santa Cruz 4,545; and Apache 4,171. Cap. Phoenix; largest cities, Tucson, Phoenix, and Prescott.

*Population.*—(1890) 59,620; (1900) 122,212.

## ARK—ARKADELPHIA.

ARK, n. *ârk* [AS. *eark*: L. Sp. and It. *arca*, a chest]: among the *anc. Jews*, an oblong chest or case in which were deposited the two tables of the law, and over which was the mercy-seat; a chest; a vessel; the large vessel or floating structure that was a place of safety to Noah and his family at the Flood. It was 300 cubits long, 50 wide, and 80 high; but as we do not know the length of the cubit, this simply gives us its proportions. It probably had little resemblance to a ship, but was more like an oblong house. The A. of bulrushes, in which Moses was protected, was made of papyrus reeds and covered with slime to keep out the water. The word Ark is used figuratively for a place of shelter. See also ARK OF THE COVENANT. ARKITE, n. *âr'kīt*, one of the persons saved in the ark: ADJ. pertaining to the ark of Noah.

ARKADELPHIA, *âr-kă-dělfĭ-ă*: t. of Clark co., Arkansas, 65 m. s.w. of Little Rock, on the Ouachita river, and on the Arkansas division of the St. Louis, Iron Mountain & Southern r.r. It contains a Baptist college, a newspaper office, and several churches. Pop. abt. 2,000.



## ARKANSAS.

ARKANSAS, *âr'kan-saw* or *âr-kăn'săs*: one of the United States, in the s. central part: having the Missouri river on the n.; the Mississippi on the e., separating it from Tennessee and Mississippi; on the s. Louisiana and Texas; and on the w. Texas and Indian Territory; 53,850 sq. m., or 34,464,000 acres. The surface of A. is varied, the Ozark Mountains crossing it from n.e. to s.w., with outlying spurs, or subordinate ranges, including the Black Hills in the n., the Ouachita Hills in the s., and the Cane Hills in the n.w. To the s. are broad prairie districts, and the remainder of the state is diversified between hills and fertile and beautiful valleys. The entire state is rich in timber, including vast forests of pine, the different species of oak, pecan, hickory, locust, walnut, cypress, cedar, and others. Arkansas has no sea-coast, but it is remarkably well provided with navigable streams. The Mississippi river, which separates the state from Tennessee and Mississippi, extends along its whole eastern border—a tortuous course of nearly 400 m. Of this great stream, one of the largest affluents is the Arkansas river, which rises in the Rocky Mountains, traverses the centre of the state in a general s.w. direction, about 1,500 m., and is navigable from its mouth into the Indian Territory. The Red river, also navigable, rises in New Mexico and flows through the s.w. part of the state, to the great commercial advantage of Sevier, Lafayette, and Hempstead counties. In the Ozark Mountains of Missouri rises the St. Francis river, which is for a short distance the boundary between Missouri and Arkansas, and which runs into the Mississippi a little above Helena, crossing the n.e. corner of the state. This also is a large river, but its navigation is greatly impeded by snags. At one point the St. Francis widens into a lake, some 50 m. long, and from 5 to 20 m. wide, a phenomenon supposed to have resulted from a sinking of the earth caused by the great earthquake of 1811. The St. Francis is 450 m. long, navigable at certain seasons for a distance of about 150 miles. White river rises in the n.w. corner of the state, runs n. into Missouri, then returns and takes a crooked course in a generally s.e. direction through A., emptying into the Mississippi a few miles above the mouth of the Arkansas. This river is about 600 m. long, navigable from 300 to 400 m., according to the season. The Black river is a tributary, navigable about 100 m.; the Spring river is another less important affluent. The Wachita or Ouachita river rises s. of the Arkansas river in the w. part of the state, and runs s.e., parallel with that stream, fertilizing the richest portion of s. Arkansas, and then runs through a part of Louisiana, emptying into the Red river near the junction of the latter with the Mississippi. It is navigable for about 350 m. from its mouth, and has for tributaries the Little Missouri, Sabine, Saline, Bayou Bœuf, etc. In Pike county, on the Little Missouri, is a natural bridge, one of the curiosities of the state. It is an objectionable feature of the low river valleys of Arkansas, that they are deficient in springs, or any good, potable water. As a consequence, the river water itself is used for drinking and

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culinary purposes, after being filtered, and rain water is collected and kept in large tanks sunk in the ground.

A line drawn across the state from s.w. to n.e., following that of the St. Louis, Iron Mountain and Southern railway, divides the upper mountainous, forest and mineral lands from the lowlands and alluvial plains. In the n. part are rich mineral deposits. Coal is known to exist in twelve counties watered by the Arkansas river, the mineral being a high-grade semi-anthracite, comparatively little worked, and supposed to cover an area of 12,000 sq. m., the veins varying between one foot and nine ft. in thickness, and from 50 to 60 ft. below the surface. There are also cannel and bituminous coals in abundance; iron ore of excellent quality is plentiful in the Ozark Mountains; zinc ore is more abundant than in any other state except New Jersey. Galena, or lead ore, frequently bearing silver, is found in different parts of the state; gold has been found in some sections, manganese is abundant, and it is believed that A. contains more gypsum than all the other states of the Union. Oil-stone of a superior quality exists in an immense bed in the Wachita valley, and salt is produced from the saline springs in the same vicinity. The formation of the land along the banks of the Mississippi river, in the e. part of the state, presents a strip ranging from 30 to 100 m. wide, low and flat, covered with dense forests, interspersed with swamps and small ponds, sometimes of stagnant and unhealthy water. This land is annually overflowed at the recurrence of the floods of the Mississippi. From this section, westward, the land gradually rises, near the centre of the state becoming hilly, these hills terminating in the Ozark Mountains, still further west, beyond which an extensive elevated plain continually increases in height towards the Rocky Mountains, in which it terminates. The valley of the St. Francis river, in the n.e. part of the state, is a continuous swamp, filled with shallow lakes and bayous, and covered with a heavy growth of cypress, gum, and sycamore; on the higher land the growth is white-oak and hickory, with occasional thickly set cane-brakes. Besides the minerals already mentioned, A. has extensive beds of lignite, millstone, and grindstone, porcelain clay, mineral ochres, and granite and other building stones. Among the natural objects of curiosity and importance are the numerous mineral and medicinal springs, and the celebrated Hot Springs, about 60 m. s.w. from Little Rock, visited annually by thousands. These springs are strongly impregnated with carbonic acid, alkalies, and carbonates, and have a temperature varying between 93° and 148°; they are claimed to effect positive and permanent cure in the case of a number of chronic diseases. But the mineral springs are not confined to the 'Hot Springs' district. There are many in different parts of the state, and one in Fulton co. discharges 15,000 bbls. of water per hour, and is in constant action at a temperature of 60°.

The soil of A. of course varies with the varying characteristics of the geology and surface conditions. The river bottom lands are the most valuable in an agricultural



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view, being capable of producing luxuriantly tobacco, corn, cotton, sweet potatoes, grapes, peaches, melons, and other fruits. As the land rises from these bottoms, it becomes less productive, but there are immense tracts submerged, which, if drained properly, would present the finest agricultural advantages. The rolling prairies of the uplands are generally well watered, though there is a notable exception in the case of Grand Prairie, 90 m. long and 30 broad, lying between the Arkansas and White rivers, almost entirely destitute of water. Besides the natural products already mentioned, there are the sassafras, maple, and mulberry among trees, the osage-orange, which grows luxuriantly, the beech, ash, elm, cotton-wood, willow, holly, butternut, juniper, plum, dogwood, palmetto, laurel, ironwood, scrub oak, hazel, sumac, and others. There are also wild plums, haws, persimmons, pawpaws, whortleberries, and chinquapins. Among the fruits are apples, apricots, nectarines, cherries, strawberries, etc. Any of the cereals grow readily; there are numerous varieties of native grasses, and though cotton is the staple product of the state, the crop of hay is not far behind it in importance. Game abounds in the forests and prairies, including deer, bear, wild turkey, prairie hen, and quail; the streams abound in fish; there are few alligators; different species of snakes abound in certain sections. The climate of A., though generally temperate, is subject to fierce north winds which produce sudden and violent changes. The average mean temperature at Little Rock is  $62^{\circ} 66'$ , the extremes being  $15^{\circ}$  and  $99^{\circ}$ , with an occasional lower fall. The rain-fall is heavy, and violent thunder storms occur in the spring and summer.

A thorough geological survey of A. was made 1887-92, with results of which the state may be proud.

*Agriculture.*—In 1880 the farm lands covered 12,061,547 acres (of which 3,595,603 were improved); comprised 94,433 farms, valued, with fences and buildings, at \$74,249,655; contained implements and machinery valued at \$4,637,497; had live-stock valued at \$20,472,425; and yielded products valued at \$43,796,261.—In 1891 the principal cereal productions were: corn, 39,982,318 bushels, from 1,648,443 acres; oats, 4,180,877 bushels, 288,332 acres; and wheat, 955,668 bushels, 140,464 acres. The cotton crop was 691,423 bales, from 1,700,612 acres. Official returns (1902) gave: corn, 50,655,042 bushels; oats, 5,048,400; and wheat, 2,245,889.—1903, Jan. 1. the farm and ranch animals comprised: horses 241,259; value \$11,293,408; mules 144,240, \$9,552,056; milch cows 279,629, \$5,433,496; oxen and other cattle 455,305, \$4,122,422; sheep 177,414, \$287,039; and swine 1,013,409, \$4,580,609—total head 2,311,256, value \$35,269,030.—The cotton crop 1902 was 999,629 bales.

*Railroads.*—The railroad development of A. before 1880 was not rapid, perhaps owing to the fact that the supreme court had declared \$5,350,000 railroad aid bonds illegal. In 1860 there were 38 m.; 1880, 859 m.; 1900, 3,092 miles.

Manufactures in Arkansas are increasing rapidly in importance, the total number of establishments, 1900, being 4,794 compared with 261 in 1850; the value of the product being \$45,197,731, compared with \$537,908 in 1850. In 1900, the number of hands employed was 26,501, the amount of wages paid being \$8,686,291. The capital investment, 1900, was \$35,960,640, and the specified industries of most importance were lumber, flour, and grist-mill products; oil, cotton-seed and cake; foundry and machine-shop products; and brick and tile.

*Mining.*—In close proximity to the coal-beds are inexhaustible deposits of hematite and other iron ores, with limestone, and hard-wood for charcoal near at hand. There are also convenient, large and never-failing water powers. In the n. part of the state zinc mines have been opened with some success, also lead and silver. The oldest mine in the state is in Pulaski county, and contains lead, copper, pyrites, and zinc blende; it is eight m. from Little Rock. Since the war considerable exploration has been made, and it is thought that a mineral belt runs from Little Rock s.w. through the counties of Pulaski, Saline, Montgomery, Garland, Hot Springs, Polk, Pike, and Sevier. In Polk co. manganese of fine quality has been discovered; in Garland co., lead, copper, and the celebrated novaculite hone-stone, also tripoli. Saline co. is among the richest in mineral wealth; containing iron, copper, lead, argentiferous galena, and nickel; steatite (soapstone) and serpentine also are found in this county. In Logan co. is a fine quality of micaceous fire-clay, and Carroll co. produces a beautiful quality of pink marble. But little capital has been invested in mining in A., though it is conceded to offer a rich field for investment in that direction.

The commerce of A. is mainly domestic, and mostly by means of the Mississippi river, the Arkansas and other navigable waters. The export trade of the state covers cotton, corn, oats, wool, lumber, hides. A very important and growing business interest has sprung up from the popularity of the hot and medicinal springs, which draw visitors from all parts of the country, thus giving a considerable impetus to industry, and awakening extended interest in the local resources.

*Education.*—Although the popular interest in public instruction has not been as deep or as enthusiastic in A. as in some older states, the improvement in recent years has been very encouraging. The great deficiency is in the means for normal training, resulting in a lack of competent teachers. It appears that few children are sent to school before seven years of age, while few remain after seventeen, facts which indicate the need of better primary and high school facilities, respectively. The school system of A. is under the administration of (1) a state superintendent of public instruction elected by the people for two years; (2) a board of commissioners of the common school fund, of which the superintendent is secretary; (3) a county examiner for each co., appointed by the county courts, and



(4) district directors, three for each district, elected by the people for three-year terms, with liability to change of one each year. Annual reports of school statistics are made by the district directors to the county examiners, by the examiners to the state superintendent, and by him to the governor. Directors failing in this duty are liable to a heavy fine. Teachers are required to keep a register of school statistics and make full monthly reports, on penalty of loss of a month's pay. In the intervals of public schools, they are permitted to teach private schools in the school buildings. Separate schools for whites and blacks are required, as in the other southern states. The prescribed studies are the ordinary English branches, there being no provision for high schools, except in the cities and large towns. The books for study are selected by the state superintendent. The means for the support of the state system of public schools are derived from the income of a state school fund, from a per capita tax of \$1 on men over 21, from such appropriations as the legislature may set apart, and from optional district taxes, the last limited to 5 mills on \$1 of the assessed value of property subject to taxation.—In 1890 the children of school age numbered: white 297,904, colored 107,683—total 405,587, and the enrolment was: white 154,259, colored 51,003—total 205,262. During the year \$869,899 were paid in wages to teachers and \$1,016,776 expended for all public school purposes. The permanent school fund 1893, Jan. 1, was nearly \$650,000. The State Industrial Univ. was better equipped in every dept. than heretofore; the number of matriculates and the average daily attendance 1891-2 were largely in advance of previous years; the curriculum has been raised to a higher standard; and the mechanical and agricultural depts. were yielding large practical results. An appropriation of \$125,727 was asked by the univ. for 1893-4. The medical school of the State Univ., at Little Rock, was amply equipped, had a faculty of 15 prominent physicians and surgeons, and graduated (1891) 16 students, (1892) 25. In the branch normal school for colored youth, machine shops have been erected, and mechanical training is in successful operation. The school for the blind had 1892, Dec., 198 pupils and 49 teachers and employés; and the deaf-mute institute, 138 pupils and 35 teachers and employés.

*History.*—Originally a portion of the territory of Louisiana, purchased from Napoleon I., 1803, for \$15,000,000, the present state of Arkansas seems to have derived its designation from the name applied by the Algonquins to a specific tribe of Indians which had their habitat within its borders. In the early French documents the word is written *Alkansas*. In 1812, the present state of Louisiana was set apart from the rest of the purchase and admitted into the Union, and the remainder was organized as Missouri territory, and continued as such until 1819, March 2, when Missouri in turn became a state, and the present state of A. a separate territory under that name. From this time until 1836, June 15, the government was territorial. At

that time a convention at Little Rock framed a constitution, and A. was admitted as a state. Its progress was generally slow, although it nearly doubled in population every ten years to 1860. In 1861, Jan., a popular vote was held on the question of appointing a convention to decide with regard to secession, and it was decided in favor of the convention by 27,412 to 15,826. The convention met in March and again in May, when a secession ordinance was passed by a practically unanimous vote. In the meantime the various arsenals had been seized by the state authorities, and a year later, March 6 and 7, 1862, was fought the decisive battle of Pea Ridge between the Confederates, led by Gen. Van Dorn, and the Union forces, by Curtis, in which the latter was the victor, and at once seized and occupied Helena. Another serious defeat of the Confederates was that of 1863, Dec. 7, when Gen. Hindman was worsted at a point near Fayetteville by Gen. Blunt, losing about 1,200 men. On Jan. 11, following, Gen. McClelland and Admiral Porter captured Arkansas Post on the A. river; and 1863, July 4, Gen. Prentiss defeated the Confederates under Gen. Holmes, in their attempt to recapture Helena. The disasters of the Confederates culminated in the capture of Little Rock, 1863, Sep. 10, by an expedition commanded by Gen. Steele, and on Oct. 30 the first step was taken looking towards the re-establishment of a state govt. in a public meeting at Fort Smith. In 1864, Jan. 8, a convention at Little Rock continued this movement by framing a loyal constitution, and on this being put to vote at a general election in March, it was carried, and entire state, county, and congressional tickets elected, and by April the new state organization was in full force. Under the reconstruction acts of 1867, A. and Mississippi became the fourth military district. It was not until 1869, March 22, that martial law ceased throughout the state.

*Finances.*—During its early history A. was a sufferer from serious financial mismanagement, a heavy state debt being incurred, whose existence has ever since seriously impeded the progress of the state. The load eventually became so heavy that an act of repudiation was nearly carried by a popular vote, the alleged repudiable indebtedness amounting to about \$11,000,000, while an admitted debt amounted to \$5,000,000 more. No decision on this question has as yet been reached.—The report of the state auditor for 1891–2 showed total receipts \$8,589,934.76; disbursements \$6,354,133.27; balance \$2,235,801.49. Assessed valuations were: (1880) \$86,409,364; (1890) \$174,737,755; (1900) \$189,999,045. The total recognized bonded debt 1901, Sept. 15, was \$1,271,000, all in 3 per cent. refunding bonds; unrecognized debt, \$8,706,773.—In 1902, Sep., there were 9 national banks (cap. \$1,120,000); 61 state banks (cap. \$1,909,753), and a number of private banks.

*Government.*—The executive authority is vested by the constitution (1874) in a gov., elected for 2 years, salary \$3,000 per annum; the legislative in a general assembly, comprising a senate of not less than 30 nor more than 35 members (35, 1903) elected for 4 years, and a house of



## ARKANSAS.

representatives of not less than 73 nor more than 100 members (100, 1903) elected for 2 years, salary of each \$6 per day; and the judicial in a supreme court of 3 judges, salary \$3,000 each per annum, circuit courts for which one judge is elected in each judicial district, co. courts of one judge each, who is also judge of probate, courts of common pleas held by the co. judges at the direction of the general assembly, chancery court in Pulaski co., prosecuting atty. in each circuit, and justices of the peace. The gov. must be a citizen of the United States, at least 30 years of age, and must have resided in the state 7 years. In case of a tie vote for gov., choice is made by a joint vote of the general assembly. The constitution gives him power to veto any single item in an appropriation bill. In his death, absence, or disability, the pres. of the senate acts in his stead. All other members of the executive dept. are elected at the same time and in the same manner as the governor. The general assembly holds biennial sessions in odd-numbered years, meeting on the second Monday in Jan., and limited to 60 days. In case of disagreement between the two houses with respect to the time of adjournment, the gov. may adjourn them to such time as he may think proper, not beyond the day of the next meeting of the gen. assembly. Senators must be 25 years of age and have a state residence of 2 years, and representatives must be 21 years of age and have similar residence. Impeachments are to be preferred by the house and tried by the senate, the chief-justice presiding. All state officers are liable to impeachment, or may be removed by the gov. for cause upon the joint address of two-thirds of each house. Judges of the supreme court are elected for terms of 8 years; they must be 30 years of age and in practice 8 years prior to election. Judges of the circuit courts must be 28 years of age, and residents in the circuits. Where a circuit judge is absent or disqualified, the members of the bar may elect a temporary special judge, and when any supreme judge is disqualified to sit in any case, the gov. appoints a special judge to take his place. The sec. of state receives a salary of \$1,800 per annum; treas. \$2,250; auditor \$2,250; atty. gen. \$1,500; supt. public instruction \$1,600; land commissioner \$1,800; U. S. dist. judges (2) \$1,000, \$1,200; collector of internal revenue \$2,750; and 10 deputy collectors \$1,200—\$1,500. The state gov. (1903) is democratic, with a party majority of 35 in the senate, 98 in the house, 133 on joint ballot. State elections are held biennially in even-numbered years, on the first Monday in Sep.; congressional and presidential elections Tuesday after first Monday in Nov. Indians, idiots, and persons convicted of crime are excluded from voting.

No co. or municipal corporation can become a stockholder in any company, or lend its credit to any such company; nor can it levy a tax exceeding  $\frac{1}{2}$  of 1 per cent. for all general purposes. No person who denies the being of a God can hold any office, or testify in any court.

The successive gov., with their terms of service, are as follows: *Terr.*: James Miller 1819-25; George Izard 1825-

## ARKANSAS.

29; John Pope 1829-35; William S. Fulton 1835-6; *State*: James S. Conway 1836-40; Archibald Yell 1840-44; Samuel Adams (acting) 1844; Thomas S. Drew 1844-48; John S. Roane 1848-52; Elias N. Conway 1852-60; Henry M. Rector 1860-64; Isaac Murphy 1864-68; Powell Clayton 1868-71; Ozro A. Hadley (acting) 1871-2; Elisha Baxter 1872-75; Augustus H. Garland 1875-77; William R. Miller 1877-81; Thomas J. Churchill 1881-83; James H. Berry 1883-85; Simon P. Hughes 1885-89; James P. Eagle 1889-93; W. M. Fishback, 1893-95; James P. Clark, 1895-97; Daniel W. Jones, 1897-1901; Jefferson Davis, 1901-6.

*Politics*.—A. had (1903) 9 electoral votes. Her votes for pres. and vice-pres. have been as follows: 1836, Martin Van Buren and Richard M. Johnson, 3; 1840, Martin Van Buren and Richard M. Johnson; 1844, James K. Polk and George M. Dallas; 1848, Lewis Cass and William O. Butler; 1852, Franklin Pierce and William R. King, 4; 1856, James Buchanan and John C. Breckinridge; 1860, John C. Breckinridge and Joseph Lane; 1864, no vote; 1868, Ulysses S. Grant and Schuyler Colfax, 5; 1872, 6 votes not counted; 1876, Samuel J. Tilden and Thomas A. Hendricks; 1880, Winfield S. Hancock and William H. English; 1884, Grover Cleveland and Thomas A. Hendricks, 7; 1888, Grover Cleveland and Allen G. Thurman; 1892, Grover Cleveland and Adlai E. Stevenson, 8; 1896, William J. Bryan and Arthur Sewall; 1900, William J. Bryan and Adlai E. Stevenson.

*Counties, Cities, and Towns*.—A. is divided into 75 counties. In 1890 the most populous *counties* were: Pulaski 47,329; Jefferson 40,881; Sebastian 33,200; Washington 32,024; Benton 27,716; Phillips 25,341; White 22,946; Hempstead 22,796; Independence 21,961; Crawford 21,714; Clark 20,997; Logan 20,774; Franklin 19,934; Columbia 19,893; Conway 19,459; Lonoke 19,263; Lee 18,886; Faulkner 18,342; and Yell 18,015. The most populous *cities and towns* were: Little Rock 25,874; Fort Smith 11,311; Pine Bluff 9,952; Hot Springs 8,086; Helena 5,189; Eureka Springs 3,706; Texarkana 3,528 (2,852 additional in the part in Tex.); Fayetteville 2,942, and Camden 2,571.

*Population*.—(1820) white 12,579, free colored 77, slave 1,617, total 14,273; (1830) white 25,671, free colored 141, slave 4,576, total 30,388; (1840) white 77,174, free colored 465, slave 19,935, total 97,574; (1850) white 162,189; free colored 608, slave 47,100, total 209,897; (1860) white 324,191, free colored 144, slave 111,115, total 435,450; (1870) white 362,115, colored 122,169, total 484,471; (1880) white 591,531, colored 210,666, total 802,525; (1890) white 818,752, colored 309,427, total 1,128,179; (1900) 1,311,564.



## ARKANSAS CITY—ARK OF THE COVENANT.

**ARKANSAS CITY:** city in Cowley co., Kan., at the confluence of Walnut Creek with the Arkansas river; on the Atchison Topeka and Santa Fé, the St. Louis and San Francisco, and the Missouri Pacific railroads; 14 m. s. of Winfield, 250 m. s.w. of Kansas City. It has a city hall, 5 banks (3 national, 1 state, 1 private), 2 loan and investment cos., 2 daily and 3 weekly newspapers. There are manufactures of lumber, flour, chairs, mattresses, windmills, etc. It is in a stock-raising and grain-growing country, possesses water-power, and has an extensive trade with Indian Territory. Pop. (1890) 8,347; (1900) 6,140.

**ARKANSAS RIVER:** next to the Missouri the largest affluent of the Mississippi. It is 2,000 m. long, rising in the Rocky Mountains on the borders of Utah, and joining the 'Father of Waters' lat. 33° 54' n., long. 91° 10' w. Flowing generally through a level country, it presents few obstacles to navigation. The principal difficulty is connected with its periodical rise and fall—the difference between season and season being not less than 25 ft. Notwithstanding this, the A. is navigable for steamboats, during nine months of the year, 800 m. from its mouth. It divides the state which takes its name into nearly equal parts, varying in breadth within the limits of the same from 3 furlongs to half a mile. Its banks, in its lower course, contain much stone-coal.

**ARKANSITE**, n. *âr'kăn-zīt* [from *Arkansas*, where it is found]: a mineral, a variety of Brookite. It occurs in thick black crystals.

**ARK OF THE COVENANT, ARK OF THE TESTIMONY, or ARK OF JEHOVAH:** one of the most important parts of the furniture of the Tabernacle which, by Divine direction, the Israelites constructed in the wilderness; and afterwards of the temple built by Solomon at Jerusalem. From Ex. xxv., xxxvii., it appears that it was a chest of shittim-wood (doubtless the wood of a species of acacia), overlaid with gold within and without, two cubits and a half in length, one cubit and a half in breadth and in height—that is, according to the common estimate of the length of the cubit, 3 ft. 9 in. in length, and 2 ft. 3 in. in breadth and height—the lid being formed entirely of pure gold, with a crown or raised border of gold round about. Within the ark was deposited the 'testimony,' consisting of 'the two tables of the law,' i.e., the stone tablets upon which the ten commandments were inscribed. The golden lid of the ark was called the *mercy-seat* or *propitiatory*, and above it were the *cherubim* (q.v.), made of the same piece of gold with it, and between them was the place of the *Shechinah* or manifestation of the Divine presence. The ark had also golden rings, through which passed staves of shittim-wood, overlaid with gold, for carrying it in the journeyings of the Israelites, concerning which very particular rules were laid down (see Numbers, iv.). While carried it was covered first with a 'covering of badgers' skins,' and above this with 'a cloth wholly of blue;' and in the tabernacle and temple it was put into the 'most holy place,' into which the high-priest

## ARKONA—ARKSUTITE.

alone was to enter upon the 'day of atonement.' The ark was called the A. of the C., because it was the appointed symbol of the presence of God as the God of Israel, and of his covenant with his people. The things of the Jewish dispensation being regarded as typical, and the Jewish religion as essentially one with the Christian, the ark is commonly regarded as a type of Christ; the excellency and unchangeableness of the moral law, as indicated by the place assigned to it within the ark, which, however, sprinkled with the blood of typical sacrifice, was interposed between it and men, who, having transgressed it, were exposed to its curse; and the mercy-seat, in like manner sprinkled with the blood of sacrifice, was interposed, as it were, between the law and God, who is represented in the Old Testament as 'dwelling between the cherubim,' and thence shining forth as the God of mercy, favorable to those that sought Him. A complete harmony is thus made out between these Old Testament types and the Christian facts.—It is worthy of notice, that sacred arks or chests have been connected with the worship of various heathen nations, and have been placed as the most sacred things in the innermost parts of the temple, which only the priests were permitted to enter. The relation of these to the ark of the Jews has been the subject of much learned inquiry, but has not yet received thorough elucidation.—The ark appears not to have been brought back from Babylon, and so never to have been in the second temple. No figure of it appears among the sacred vessels of the temple represented on the Arch of Titus.

ARKONA, *âr-kō'nâ*: n.e. promontory of the island of Rügen, in the Baltic, almost the most n. extremity of Germany. Its steep cliffs mainly consist of mixed chalk and loam, with horizontal veins of flint; there is a small deposit of pure chalk towards the east. Myriads of sand-martins build in the clefts of these cliffs. The view from their summit extends to the coast of Jasmund on the right, on the left to the islands of Hiddensøe and Möen. The name A. is very ancient. In the chronicles of Saxo Grammaticus we find it written Archona, but its derivation is quite uncertain. On the w. side is the famous wall or fortified inclosure in which stood the temple of the Wend deity Swantewit. King Waldemar I. of Denmark, after a bloody conflict, took possession of the fortress in 1168, burnt the idol and its temple, and carried away its treasures to Denmark. On its site, a lighthouse, 75 ft. high, was built in 1827.

ARKOSE, n. *âr'kōs* [Eng. *ark*]: a mineral compound formed of the same materials as granite, from the disintegration of which it has evidently been derived.

ARKSUTITE, n. *âr'kô-sô-tīt*, or ARK'SUDITE, *-dīt* [from *Arksut Fiord*, in s. Greenland]: mineral classed by Dana in his Cryolite group of fluorine compounds. It is a white, translucent, and brittle species, with vitreous lustre, except on cleavage faces, where it is pearly. Its composition is; fluorine, 51·03; alumina, 17·87; lime, 7·01; soda, 23·00; water 0·57. It has been proved to be Chiolite,



## ARKWRIGHT.

ARKWRIGHT, *ârk'rīt*, SIR RICHARD: 1732, Dec. 23---1792; b. Preston, Lancashire: celebrated for inventions in cotton-spinning. Of humble origin, the youngest of thirteen children, and bred to the trade of a barber, his early opportunities were exceedingly limited. In 1760, he gave up his business as a barber in Bolton, and became a dealer in hair. A secret process for dyeing hair, said to have been discovered by himself, increased considerably the profits of his trade. Very little is known regarding the first movements of his mind in the direction of mechanical invention. His residence in the midst of a cotton-spinning population naturally led him to take an interest in the processes used in that manufacture. That the development of his mechanical ingenuity was not, however, due to circumstances, is proved by the fact that his first effort was an attempt to discover the perpetual motion. Having no practical skill in mechanics, he secured the services of a watchmaker, named Kay, to assist him in the construction of his apparatus. About 1767, he seems to have given his whole attention to inventions in cotton-spinning. In the following year he removed to Preston, where he set up his first machine, the celebrated *spinning-frame*, consisting chiefly of two pairs of rollers, the first pair moving slowly in contact, and passing the cotton to the other pair, which revolved with such increased velocity as to draw out the thread to the required degree of fineness. No previously invented machinery had been able to produce cotton thread of sufficient tenuity and strength to be used as warp. An invention, indeed, by Mr. Charles Wyatt, of Birmingham, which was patented in 1738, but never succeeded, deprives A. of the honor of having been the first to use rollers in spinning; but there is no reason to believe that he owed anything to this previous attempt. The first suggestion of the idea, he said, was derived from seeing a red-hot iron bar elongated by being made to pass between rollers. At this time A. was so poor that he needed to be furnished with a suit of clothes before he could appear to vote at an election as a burgess of Preston. He soon removed to Nottingham, to escape the popular rage, which had already driven Hargreaves, the inventor of the *spinning-jenny*, out of Lancashire. Here he fortunately fell in with Mr. Jedidiah Strutt, of Derby, the celebrated improver of the *stocking-frame*, who entered into partnership with him, in conjunction with his partner, Mr. Need. In 1769, A. set up his first mill, driven by horses, and took out a patent for his invention. In 1771, he set up a larger factory, with water-power, at Cromford, in Derbyshire. The remarkable capabilities of his mind were strikingly evinced in the management of the great business which now demanded his undivided attention. Without personal experience, and with no model to guide him, he introduced a system of management so admirable that it was afterwards universally adopted, and has never been materially improved. In 1775, he took out a fresh patent for various additional improvements in machinery. The success attending these undertakings stimulated rivals to invade

## ARKYS—ARLES.

his patent; and to such an extent did other cotton-spinners use his designs, that he was obliged, in 1781, to prosecute at once nine different manufacturers. The first action against Colonel Mordaunt, backed by a strong combination of Lancashire manufacturers, was lost, solely on the ground that his description in his specification was not sufficiently clear and distinct. The other actions were abandoned; and, in the following year, A. published a pamphlet containing a statement of his case. In a new trial, in 1785, he obtained a favorable verdict. The whole question, however, was brought finally before the Court of King's Bench, a few months later, when A.'s claim to the inventions patented was for the first time called into dispute. On the doubtful evidence of a person named Highs, or Hayes, combined with that of A.'s old assistant, Kay, the jury decided against him, and his patent was annulled. This was but the formal outcome of an opposition which had from the beginning marked out A. as an object of hostility. The manufacturers at first combined to discountenance the use of his yarn. When the yarn was made into calicoes, and parliament was petitioned to lessen the duty on that cloth, they strenuously opposed the measure, but in vain. Popular animosity was also excited against the man who abridged labor, but in reality increased its sphere; and on one occasion, a large factory belonging to A. was destroyed in the presence of a powerful military and police force, without a word of interference from the magistrates. The energy and good sense of A., however, triumphed over all opposition; and at the time of his death, in 1792, the value of his property amounted to about half a million sterling. In 1786, he was appointed high-sheriff of Derbyshire; and on the occasion of presenting an address to the king, congratulating him on his escape from the knife of the maniac Margaret Nicholson, he received the well-merited honor of knighthood. A severe asthma had pressed upon him from his youth; and a complication of disorders, the result of his busy sedentary life, terminated his honorable career at the comparatively early age of sixty.—See SPINNING.

ARKYS, n. *ârk'is* [Gr. *arkus*, a net]: genus of spiders. The *A. lancier*, a native of S. Amer., is yellow with red at the sides.

ARLES, n. plu. *ârlz* or *ârlz* [Scotch: L. *arrha*: F. *arrhes*: It. *arra*, earnest money, a deposit: Gael. *earl*, provision, caution]: in *Scot.*, a piece of money given for confirming a bargain, as in hiring a servant; earnest-money. ARLE, v. *ârl*, to give a piece of money to a person to confirm a bargain. ARLING, imp. *âr'ling*. ARLED, pp. *ârl'd*, hired by receiving arles.

ARLES, *ârlz* (anciently, *Arelate*): one of the oldest towns in France, on the left bank of the principal branch of the Rhone, after it has divided into a delta, in the dept. of Bouches du Rhone. A. has considerable trade. It manufactures silk, hats, tobacco, brandy, etc., and is a



## ARLINGTON—ARM.

market for the productions of the surrounding country. It also possesses a college, a naval school, a public library, and a superb museum of antiquities in natural history. The marshes which long rendered the district unhealthy have been largely drained, and a canal has been formed which connects it with the s. coast. Railways also bring it into easy communication with Marseilles, Avignon, Nîmes, Montpellier, etc. Under the Romans, it was the seat of a prefect; afterwards the residence of the Gothic king, Eurich; and, 879, was the metropolis of the kingdom of Arelate. See BURGUNDY. In the early Christian times, important synods were convened here (314, 354, 452, and 475). Among the antiquities are a magnificent amphitheatre, which could contain between 20,000 and 30,000 spectators; the ruins of a palace of Constantine the Great; and a mediæval cathedral with a splendid portal arch. Pop. (1893) municipality, 24,288; town, 14,431.

ARLINGTON, *âr' lîng-ton*: town in Middlesex co., Mass.; on the Boston and Maine railroad; 6 m. n.w. of Boston, with which it is connected also by horse-railroad. This pleasant and prosperous town has market-gardening and ice-cutting industries, 1 national and 1 savings bank, a weekly newspaper, several churches, a public library, and a number of manufacturing establishments. Pop. (1880) 3,906; (1890) 5,629; (1900) 8,603.

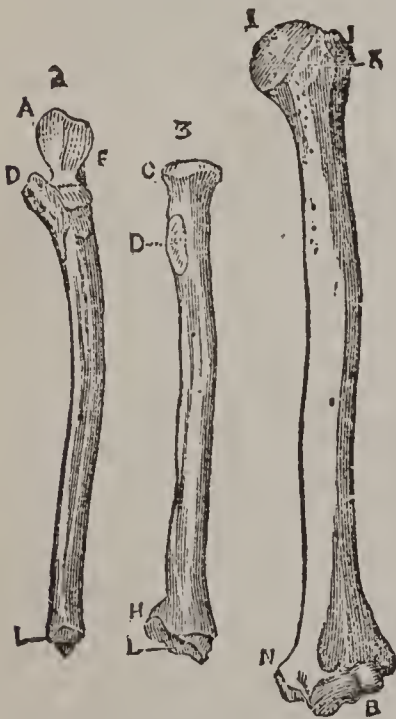
ARM, v. *ârm* [F. *armer*; Sp. *armar*, to arm; F. *arme*, a weapon—from L. *armārē*, to arm—from *arma*, weapons of war]: to furnish with arms; to take up arms. ARM'ING, imp. ARMED, pp. *ârmd*: ADJ. *ârm'ēd*, furnished with weapons; morally fortified; in *her.*, colored. ARM'LESS, a. without weapons. ARMS, n. plu. *ârmz*, weapons of war; state of hostility; war in general; signs armorial. ARMY, n. *âr'mî*; ARMIES, plu. *âr'mîz* [F. *armée*]: a body of men armed for war; a host; a large number. FIREARMS, warlike weapons only effective with powder and shot, as distinguished from swords and lances. PASS or PASSAGE OF ARMS, a kind of combat with swords. STAND OF ARMS, a complete set of arms for one soldier. UNDER ARMS, in a state of immediate readiness for fighting. To ARMS, a call or summons to engage in actual hostilities. SMALL-ARMS, those which can conveniently be carried by a soldier. To THROW or LAY DOWN ARMS, to surrender to an enemy by giving up arms. SIDE-ARMS, such arms as may be worn attached to the person, as sword, bayonet, etc. COATS OF ARMS, in *her.*, any signs or devices of heraldry painted or engraved, used as symbols of quality or distinction. ARMA, n. plu. *âr'mă*, in *bot.*, such appendages of plants as prickles and thorns. AR'MY-LIST, n. a published printed list of officers of the army. ARMING-BUCKLE, n. in *heraldry*, a lozenge-shaped buckle. ARMING-DOUBLET, n. a surcoat. ARMING-POINTS, n. pl. the fastenings keeping the several pieces of armor from separating. ARMING-PRESS, n. a press used in book-binding.

ARM, n. *ârm* [AS. *earm*; L. *armus*, the shoulder-joint,

## ARM.

the arm: Icel. *armr*]: a limb of a body; a branch of a tree; inlet of the sea. **ARMFUL**, n. *ârm'fool*, as much as an arm can embrace when bent in towards the breast. **ARMHOLE**, n. *ârm'höl*, Prov. and OE., the arm pit; the hole in a garment for the arm. **ARM'-LIKE**, a. *-lîk*, of the form or appearance of an arm. **ARM'LESS**, a. without arms. **ARM'LET**, n. a little arm; a bracelet. **ARM-CHAIR**, n. a chair with arms to support the elbows. **ARM'-PIT**, n. the cavity under the shoulder. **FORE-ARM**, n. the part of the arm lying between the elbow and the wrist. **ARM OF THE SEA**, a part which runs far into the land. **ARM'S-LENGTH**, n. the length of the arm: **ADJ.** at a distance. **ARMS-END**, n. the end of the arms; a good distance off. **ARM-SHAPED**, a. shaped like the arm. **ARM'S-REACH**, n. the distance to which the arm can reach. **ARM-IN-ARM**, or **ARM-AND-ARM**, ad. or a. with one's arm interlocked in that of another.

**ARM**: the upper extremity of the human body; consisting of two portions—the A., strictly so called, and the forearm; the former having one bone, the humerus (1),



Bones of the Human Arm.

which moves freely by a globular head upon the scapula, forming the shoulder-joint; and the latter having two bones, the radius (3) and ulna (2), which move on the lower end of the humerus, forming the elbow-joint, and below with the carpus forming the wrist.

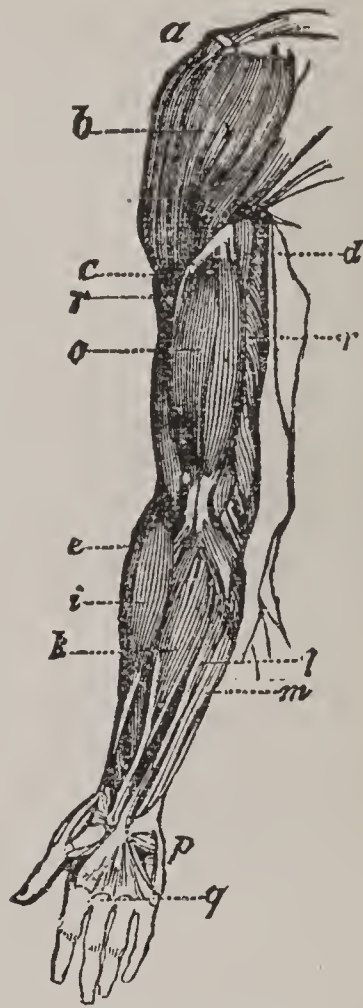
The humerus is attached by a loose capsular ligament to the scapula, allowing great freedom of motion; and were it not for the muscles passing into I and K, would be frequently dislocated, but it is supported by these muscles on all sides except underneath or opposite the armpit, into which the head of the bone is often driven. The roundness of the shoulder is due to the head of the humerus, so that any displacement is accompanied by a

flattening, which at once suggests the nature of the accident. On the shoulder is a large triangular muscle, the deltoid, which lifts the A. from the side. At the back is the triceps, which extends the forearm; in front are two muscles which flex or bend it—the biceps, and the brachialis anticus; and on each side below are muscles passing to the forearm and hand; while on each side above, the great muscle of the back (*latissimus dorsi*) and that of the chest (the *pectoralis major*) are inserted on each side of a groove, wherein lies one of the tendons of the biceps (q.v.) The motions of the ulna are flexion or bending effected by the biceps, and extension or straightening by the great exten-



## ARM.

sor muscle, the triceps, its projections, D and A, being received in these movements into corresponding depressions on the humerus. The movements of the hand are principally due to the radius, the head of which rolls at C and H upon the ulna at F and L, thereby turning the palm downwards (pronation), or restoring the palm upwards (supination), these movements being effected by muscles, two for each movement, which, taking their fixed points from the humerus and ulna, pull the radius round on the latter. The elbow-joint is ginglymoid or hinge-like, and therefore has strong lateral ligaments; but it is extremely liable to dislocations, often accompanied by fracture, especially in the young. The accident being followed by severe inflammation, the joint is very apt to stiffen, thereby seriously (see ANCHYLOSIS) deteriorating from the usefulness of the limb; it is, therefore, unadvisable to keep the limb too long in any one position after such an injury. This joint is also very liable to disease; but as this is confined to the ends of the bones, the small portions of the latter affected can be readily cut out, and the arm be restored to usefulness and mobility in a few weeks.



**Human Arm:**

*abc*, deltoid muscle; *d*, coraco brachialis muscle; *r, r*, triceps; *e, i*, extensors of wrist and long supinator of the hand; *fm*, flexor of fingers and radial and ulnar sides of the wrist, and *l*, palm of the hand, or palmaris longus; *p*, palmaris brevis; *q*, palmar fascia; *o*, biceps.

The upper extremity is supplied with blood by the brachial artery, the continuation of the axillary trunk. The veins collect into large superficial trunks, which unite at the bend of the elbow, at which situation one is frequently selected for venesection, and then pass on to the axillary, on the outside by the cephalic vein, on the inner side by the basilic.

The nerves pass down as large cords by the side of the artery, and diverge from it to their ultimate distributions; the musculo-spiral soon passing round at the back to appear on the outside, and become the radial and posterior interosseous nerves; the ulna running behind the internal condyle, N., (Fig. 1), for which it has obtained the term 'funny bone,' from the electric-like thrill which passes along the arm when the nerve is struck or pressed. The

## ARM—ARMADA.

median, as its name implies, keeps a middle course with the artery.

In wounds of the forearm, the bleeding is often excessive but may be at once controlled by pressure on the brachial artery, on the inner side of the biceps.

The arm affords excellent illustrations of some of the principles of mechanics. The insertion of the muscles so near, as will be seen, to the fulcra or centres of motion, involves a loss of power in the usual sense of the word; there is, however, a corresponding gain in velocity at the end of the lever; and for most of the purposes to which the hand is put, agility is of far greater moment than dead strength.

ARM: in maritime language (besides the obvious application to weapons of warfare), a term applied to each extremity of a bibb, or bracket, attached to the mast of a ship for supporting the trestle-trees. The same name is also given to a part of the anchor. See ANCHOR.—In military language, the infantry, the cavalry, the artillery, and the engineers are each called 'an A.' of the service—equivalent to branch or department.

ARMADA, n. *ár-mă'dă* [Sp. *armada*, the fleet, the navy—from *armar*, to arm—from L. *armāre*, to equip with arms; *armătă*, armed]: a fleet of war-ships; especially the great Spanish fleet of war-ships which attempted the invasion of England in the reign of Elizabeth, 1588. The king of Spain, Philip II., had resolved to strike a decisive blow at the Protestant interest, by conquering England, which Pope Sixtus V. had made over to him. The ports of Spain, Portugal, and other maritime dominions belonging to him had long resounded with the noise of his preparations, and the most eminent Rom. Cath. soldiers from all parts of Europe flocked to take a share in the expedition. The Marquis of Santa-Croce, a sea-officer of great reputation and experience, was selected to command the fleet, which consisted of 130 vessels, of greater size than any hitherto seen in Europe. The Duke of Parma was to conduct the land-forces, 20,000 of whom were on board the ships of war, and 34,000 more were assembled in the Netherlands, ready to be transported into England; so that, as no doubt was entertained of success, the fleet was ostentatiously styled the Invincible A. Nothing could exceed the terror and consternation which seized all ranks of people in England upon the news of this terrible A. being under sail to invade them. A squadron of not more than thirty ships of the line, and those very small in comparison, was all that Elizabeth had to oppose it by sea; and it was considered impossible to make any effectual resistance by land, as the Spanish army was composed of men well disciplined and long inured to danger. But although the English fleet was much inferior in number and size of shipping to that of the enemy, it was much more manageable, while the dexterity and courage of the mariners were greatly superior. Lord Howard of Effingham, a man of

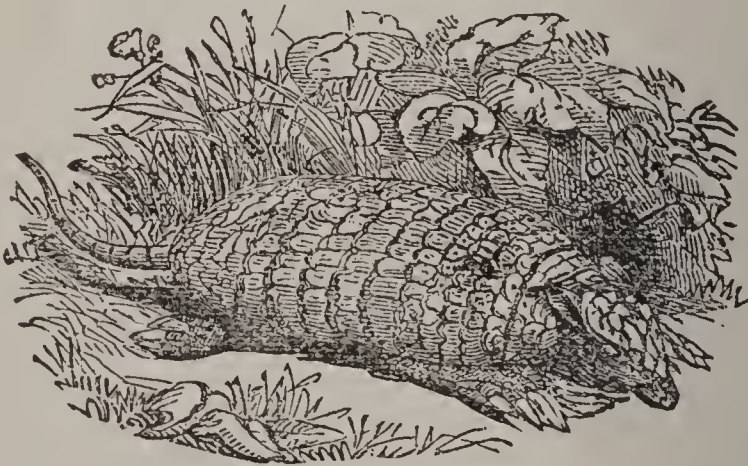


great valor and capacity, took upon him, as lord high admiral, the command of the navy; Drake, Hawkins, and Frobisher, the most renowned seamen in Europe, served under him; while another squadron, consisting of forty vessels, English and Flemish, commanded by Lord Seymour, lay off Dunkirk, in order to intercept the Duke of Parma. Such was the preparation made by the English; while all the Protestant powers of Europe regarded this enterprise as the critical event which was to decide forever the fate of their religion. Meantime, while the Spanish A. was preparing to sail, the admiral, Santa-Croce, died, as likewise the vice-admiral, Paliano; and the command of the expedition was given to the Duke of Medina Sidonia, a person utterly inexperienced in sea affairs; these unexpected circumstances served, in some measure, to frustrate the design. Some other accidents also contributed to its failure. Upon leaving the port of Lisbon, the A. next day met a violent tempest, which sank some of the smallest of the ships, and obliged the rest to put back into the harbor. After some time spent in refitting, the Spaniards again put to sea, where they took a fisherman, who gave them intelligence that the English fleet, hearing of the dispersion of the A. in a storm, had returned to Plymouth, and that most of the mariners were discharged. From this false intelligence, the Spanish admiral, instead of going to the coast of Flanders, to take in the troops stationed there, resolved to sail directly to Plymouth, and destroy the shipping laid up in the harbor. But Effingham was very well prepared to receive him, and had just left port, when he saw the Spanish A. coming full sail towards him, disposed in the form of a half-moon, and stretching seven miles from one extremity to the other. The English admiral, seconded by Drake, Hawkins, and Frobisher, attacked the Spaniards at a distance, pouring in their broadsides with admirable dexterity. They did not choose to engage the enemy more closely, because they were greatly inferior in number of ships and guns, as well as in weight of metal; nor could they attempt to board such lofty vessels without manifest disadvantage. In this action, however, two Spanish galleons were disabled and taken. As the A. advanced up the Channel, the English still followed and infested its rear; and as their ships continually increased from different ports, they soon found themselves in a capacity to attack the Spanish fleet more nearly, and accordingly fell upon them while they were taking shelter in the port of Calais. To increase their confusion, Howard selected eight of his smaller vessels, which, after filling them with combustible materials, he sent one after another, as if they had been fire-ships, into the midst of the enemy. The Spaniards, taking them for what they seemed to be, immediately bore off in great disorder; while the English, profiting by their panic, captured or destroyed about twelve ships. The Duke of Medina Sidonia being thus driven to the coast of Zealand, held a council of war, in which it was resolved that, as their ammunition began to fail, as their fleet had

## ARMADILLO.

received great damage, and as the Duke of Parma had refused to venture his army under their protection, they should return to Spain, by sailing round the Orkneys, as the winds were contrary to their passage directly back. Accordingly, they proceeded northward, and were followed by the English fleet as far as Flamborough Head, where they were terribly shattered by a storm. Seventeen of the ships, having 5,000 men on board, were afterwards cast away on the Western Isles and the coast of Ireland. Of the whole A., fifty-three ships only returned to Spain, and these in a wretched condition. The seamen, as well as the soldiers who remained, were so overcome with hardships and fatigue, and so dispirited by their discomfiture, that they filled all Spain with accounts of the desperate valor of the English, and of the tempestuous violence of that ocean by which they were surrounded.

ARMADILLO, n. *ár'mă-dîl'lo* [Sp. dim. of *armádo*, a man in armor—from L. *arma*, arms, from its scaly covering] (*Dasypus*): genus of *Mammalia* of the order *Edentata* (i. e., toothless)—not, however, truly toothless, but having feeble teeth destitute of true roots, and set apart from each other, and so that those of the one jaw fit into the interstices of those of the other. The number of the teeth is different in different species. The muzzle is elongated, and the tongue smooth and slender, with a glutinous saliva, adapted to the capture of ants and other



Armadillo.

insects, after the manner of the ant-eaters, but not long and extensile, like theirs. The limbs are short and strong; as are also the claws, and the animals have a great aptitude for digging and burrowing, by means of which they seek to shelter themselves from enemies—burrowing in sand or soft earth with such rapidity that it is almost impossible to dig them out, and indeed it can only be done by persevering till they are exhausted. But that which peculiarly distinguishes the A., and in which this genus differs from all the other mammalia, except the *Chlamyphorus* (q.v.), is the bony armor with which the body is covered, and which consists of polygonal plates not articulated, united on the head to form a solid covering, and similarly to form



## ARMADILLO—ARMAGH.

solid bucklers over the shoulders and the haunches; and between these, disposed in transverse bands, which allow of freedom of motion to the body, similar bands, in most species, protecting also the tail. Within these plates the animal is able to roll itself up like a hedgehog. Armadillos feed not only on insects, but on vegetable and animal food of almost every kind, which by decomposition or otherwise has acquired a sufficient softness. Some of them prefer vegetable food, others delight chiefly in carrion. They are all natives of the warm and temperate parts of South America, in the woods and pampas of which they are found in immense numbers. They are timid and inoffensive, although, when they are incautiously assailed, injury may be received from their claws. Their flesh is esteemed a delicacy, particularly that of the species which feed chiefly on vegetable food. The largest species is fully three ft. long, exclusive of the tail; the smallest, not above ten inches. The species are numerous, and the genus has been divided into a number of sub-genera, which some naturalists elevate into genera, naming the family *Loricata* (i. e., mailed). To this family belongs also the genus *Chlamyphorus*, also South American. Fossil remains of gigantic extinct armadillos have been found in the pleistocene strata of South America, forming the genus *Glyptodon* of Owen, so named from the fluted teeth.

**ARMADIL'LO:** scientific name of a genus of *Crustacea* of the order *Isopoda* of Cuvier. This is one of the genera usually included under the popular name of Woodlouse, and one of which (*Porcellio*) is very generally known by that of Slater. The armadillos derive their name from the scaly armor of their body, in which an analogy is found to the mailed quadrupeds of South America. These little creatures have, in a remarkable degree, the power of rolling themselves into a ball, when alarmed, so as to expose nothing but the plates of the back, and have thence received the name of Pill Beetles. Like some of the other closely allied *Isopoda*, they were at one time reputed to possess medicinal virtues, now accounted merely imaginary. They were not only used in a dried and pulverized state, but they are said to have been actually swallowed entire as pills. The *Isopoda* are now made a sub-order of *Tetradacapoda* (fourteen-footed).

**ARMAGH, ár-má':** a small inland county in Ulster, Ireland, bounded n. by Lough Neagh, e. by Down, s. by Louth, w. by Monaghan and Tyrone: greatest length 32 m., and breadth 20; 512½ sq. m., about four-fifths being arable, and a 36th part in woods. The surface is hilly in the s., and undulating in the centre, attaining in Slieve Gullion, in the s.w., the height of 1,893 ft. The other chief heights are the Newry Mountains, 1,385 ft.; the Armagh-breague Hills, 1,200; and Mullyash, 1,034. The country bordering upon Lough Neagh is low and boggy, and the Louth plain extends into the s. end of A. The principal rivers, navigable in their lower parts, are the Upper Bann, flowing out of Down n.w. 11 m. before it

## ARMAGH—ARMAGNAC.

enters Lough Neagh; and the Blackwater, which, in its lower part, separates A. from Monaghan. The rocks of A. are—Lower Silurian in the s. and middle of the county; the trap of Antrim, with the underlying greensand, around Portadown; carboniferous limestone in the basins of the Blackwater, and its tributary the Callan; granite in the mountains of the s.e.; and tertiary strata bordering Lough Neagh. The soil is fertile except in the southern extremities. In 1880, 163,236 acres were in crop, the principal crops being oats, potatoes, wheat, turnips, and flax. The stock in that year was 13,815 horses, 79,474 cattle, 9,125 sheep, 15,136 pigs. The n. and central parts of A. have a dense population, and contain low hills cultivated to the tops, hedgerows, orchards, and thickly-scattered farm-steadings. The county is mostly in the diocese of Armagh. It returns three members of parliament. The chief towns are A., Lurgan, Portadown, and Newry (which, however, is mostly in Down). Pop. (1871) 179,260; (1881) 163,177; of whom about half are Rom. Cath., while of the remainder, the Episcopalians greatly outnumber the Presbyterians (1891) 143,289; (1901) 125,392.

ARMAGH: capital of the county of A., in a carboniferous limestone district, in the n.w. of the county. It is situated around and on a gentle eminence, hence its original name, Ard-Magha, 'the high field.' It is built of limestone. The cathedral, of red sandstone, is cruciform—184 by 119 ft.—and is supposed to occupy the site of that erected by St. Patrick in the 5th c. It has had extensive repairs, chiefly at the cost (£10,000) of the late lord primate, John George Beresford. A Gothic Rom. Cath. cathedral occupies the principal height to the n., and the primatial palace that to the s. There is a fever hospital for forty patients, maintained by the late primate, and a lunatic asylum for four counties. A. is the seat of the archiepiscopal see of the primate and metropolitan of all Ireland, who, before the disestablishment of the Irish Church, had an income of £12,087 a year. The chief manufacture is linen-weaving. A., from the year 495 to the 9th c., was the metropolis of Ireland, the native kings living at Eamania, 2 m. to the w. of the city. It was then renowned as a school of theology and literature—its college being the first in Europe. After the Reformation, it suffered severely in the conflicts between the English and Irish; and it contained only three slated houses in 1765. Pop. (1871) 8,946; of whom 4,691 were Rom. Cath., 3,020 Episcopalians, 918 Presbyterians; (1901) about 10,500.

ARMAGNAC, *âr-mân-yâk'* (*Ager Aremonicus*): old name of a district in the s. of France, which at one time seems to have extended from the valleys of the Pyrenees to the Garonne. It is now included in the departments of Hautes Pyrénées and Gers. The remarkably fertile land, producing grain and the best descriptions of wine, and also favorable for pasturage, is cut up into an extraordinary number of small estates, and divided among numerous petty proprietors. The principal branch of trade is the



## ARMAGNAC—ARMANSPERG.

distillation of the brandy known in commerce as *Eau d'Armagnac*, which rivals those of Cognac and Saintonge. The ancient capital is Lectoure, on the river Gers, with about 3,000 inhabitants. To the s. of it lies Auch, the chief town of the department of Gers. Pop. about 12,000. The people are noted for their simplicity, strength, and bravery; but are extremely credulous and ignorant. Formerly, their services were highly valued in times of war. The A. family, descended from the old Merovingian king, Clovis, was important in French history.

ARMAGNAC, BERNARD VII., Count d': leader of the 'Armagnacs' in their civil war with the Burgundians, and afterwards chief minister and constable of France under Queen Isabeau. His unscrupulous and tyrannical measures made him odious to the people, and in 1418, when Paris was taken by the Burgundians, he and a large number of his followers were massacred.

ARMAGNAC, JEAN V., Count d': b. abt. 1420: grandson of Bernard. He was excommunicated by the pope for marrying his own sister, who had been engaged to Henry VI. of England. He joined the League of the Public Good against Louis XI. of France, through which he lost his estates, but they were restored to him. He was put to death by the king's troops in 1473.

ARMAMENT, n. *âr'mă-měnt* [L. *armamen'ta*, implements, utensils—from *arma*, weapons of war]: a land or naval force fitted out for war. Also, all the weapons collectively employed in sea and land battles, are called the A. of a ship or of an army.

ARMAN, n. *âr'măn*: a confection for restoring appetite in horses.

ARMAND, *âr-môn'*, CHARLES, Marquis de la Rouarie, *dêh lâ rô-â-re'*: 1756–93: French soldier who volunteered in the American army during the Revolutionary war, and rose to the rank of brig.gen. He afterwards took part in the French Revolution, on the royalist side, serving in Brittany and Anjou.

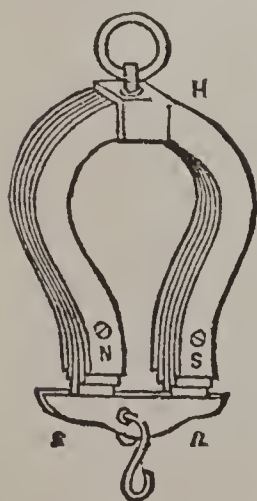
ARMANSPERG, *âr'măn-spěrg'*, JOSEPH LUDWIG, Count of: 1787–1853; b. in Lower Bavaria: formerly president of the government in Greece. He early began an administrative and diplomatic career. On the accession of King Louis to the throne, A., who had already occupied several important posts, was summoned to Munich, where, rapidly rising from one dignity to another, he at length became minister of finance and of foreign affairs. In both capacities he proved active and successful; but he drew upon himself the hatred of the Camarilla by his strenuous opposition to the claims of Rome, as well as by his attempts to identify himself with the decidedly liberal party. The consequence was that, in 1831, he lost his post, and in the same year was appointed ambassador to London, but preferred retiring to his family estate. However, he could not resist the king's repeated request that he would undertake the formation of his son's government in Greece; and

## ARMATOLES—ARMATURE.

accordingly, accompanying young King Otho, A. landed at Nauplia, 1833, Jan. For four years he was at the head of public affairs, and Greece derived many benefits from his administration; but the heat of party strife and court intrigues led to his dismissal, and he left Greece, 1837, March, retiring to his estate near Deggendorf.

**ARMATO'LES:** a body of Greek militia, first formed under the reign of Sultan Selim I. about the beginning of the 16th c. They were intended to preserve the fertile plains from the ravages of the *Klephts* (mountain robbers of Thessaly) who had never been entirely conquered by the Turks. The A. themselves were originally Klephts, but received their more honorable designation when the Porte had metamorphosed them into a sort of military police. The safety of the public roads was intrusted to their care. The whole of Northern Greece was divided into sixteen districts (*capitaineries*), each placed under the supervision of a chief of these militia, who, however, had himself to receive orders from a Turkish pasha or Greek bishop. But although the A. frequently suppressed the brigandage of the Klephts, they still regarded them in the light of brothers, inasmuch as they had a common origin and faith; both detested the oppressors of their country; and the sentiment of patriotism overruled every other consideration. This sympathy at last appeared to the Turks so dangerous that they grew alarmed, and desired to substitute for the A. the Mohammedan Albanians, who were the implacable enemies of the Greeks, which resolution did not a little to hasten the insurrection which the Porte ever dreaded. The moment it broke out, the A. pronounced themselves in favor of the national cause, and in the war of independence that ensued distinguished themselves by their brilliant exploits.

**ARMATURE**, n. *âr'mă-tūr* [F. *armature*, brace, fencing: L. *armātūra*, armor, equipment—from *arma*, arms]: pieces of soft iron placed at the extremities or poles of magnets to preserve their magnetic power. When magnets are allowed to remain any length of time without such appendages, in consequence of the disturbing influence of



terrestrial magnetism they lose considerably in strength; but when they are provided with them their magnetism is kept in a state of constant activity, and thereby shielded from this disturbance. The reason of this is found in two facts well known in the science of magnetism—viz., that when a piece of soft iron is brought into contact with the extremity of a magnet, it is itself induced to become magnetic; and that the unlike poles of two different magnets powerfully attract each other. Referring to the figure, the north pole, N, of the horseshoe magnet, NHS, acting on the armature, *sn*, induces it to become a magnet, having its

armature, *sn*, induces it to become a magnet, having its



## ARMED VESSEL.

south pole, *s*, next to *N*, and its north pole, *n*, at the opposite extremity. The pole, *S*, by virtue of its magnetic affinity, powerfully attracts the north pole, *n*, thus formed, and adds its own inducing influence to heighten the magnetic condition previously induced in the armature by the pole *N*. The *A.*, from the combined action of both poles of the horseshoe magnet, is thus converted into a powerful magnet, with its poles lying in an opposite direction to that of the primary poles. The original magnet is, in consequence, brought into contact with one of its own making, the exact counterpart of itself—a condition highly favorable to the maintenance of its strength. It is due to the same mutual attractions that a much larger weight can be suspended from the *A.* thus placed, than the single poles can together sustain. Bar magnets may be armed in the same way by laying them at some distance parallel to each other, with their unlike poles towards the same parts, and then connecting their extremities by two pieces of soft iron. When a magnet, such as a compass-needle, is free to take up the position required by the magnetism of the earth, the earth itself plays the part of an armature.

**ARMATURE**, in Botany: the hairs, prickles, etc., covering an organ.

**ARMED VESSEL**: distinguished from a man-of-war by the temporary period of its employment, being a merchant ship in the service of a govt. for a specified time and purpose, armed and equipped in accordance with the requirements of the case. Thus privateers and letters-of-marque are included under this head; so in Great Britain are certain lines of royal mail steamers, which can be placed in commission in time of war; and the same was the case during the American civil war, when many freight and passenger steamers were employed as transports and for other important naval uses; notably the *Vanderbilt* and the *Star of the West*. In 1892 arrangements were effected through an act of congress for the building (or transfer) of a number of trans-Atlantic passenger steamers—some being of the largest class and highest speed—which should receive American registration, on the condition that they should be at the service of the U. S. govt. as naval vessels in time of war.

## ARMENIA.

ARMENIA, *âr-mě'nĭ-a*: a high table-land on the s. slope of the Caucasus, stretching down towards Mesopotamia. It has had different boundaries in the various centuries of its history. It is the original seat of one of the oldest civilized peoples in the world, the Armenians, who belong to the Indo-Germanic family of nations. Their oldest records contain nothing certain beyond the facts that, in ancient times, they were governed by independent kings, but afterwards became tributary to the Assyrians and Medes. That dim period which wavers between myth and history begins, in the case of A., about the middle of the 6th c. B.C., when King Dikran, or Tigranes I. of the Haig dynasty, restored the independence of the kingdom. The last king of this dynasty was slain in battle against Alexander the Great, who conquered the country. After Alexander's death, A. passed through several changes of fortune under the Seleucidæ, who appointed governors over it. Of these, two—Artaxias and Zariadres—made themselves independent of their sovereign, Antiochus the Great, while he was engaged in his contest with the Romans, B.C. 223-190. They divided the province into two districts—Artaxias taking A. Major (that part of the country lying e. of the Euphrates), and Zariadres A. Minor (the part to the w. of that river). The dynasty of Artaxias did not reign long; for about the middle of the 2d c. B.C., we find A. Major in the possession of a branch of the Parthian Arsacidæ, of which the most powerful king was Tigranes the Great, who added to the conquests made by his predecessors in Lower Asia and the region of the Caucasus, Syria, Cappadocia, and A. Minor; defeated the Parthians, and took from them Mesopotamia and other countries. He lost all these territories by his war with the Romans, into which he was led by his father-in-law Mithridates, king of Pontus, B.C. 63. After this, the assaults of the Romans from the w., ever growing more and more vigorous, and those of the Parthians from the e., hastened the downfall of A. Major. The successors of Tigranes became dependent, partly on one nation, partly on the other, while internally the nobles broke through the restraints of a feeble monarchy, and claimed the privileges of petty kings. Under Trajan, A. Major was for a short time a Roman province. Its subsequent history exhibited an unbroken series of tumults and wars, of violent successions to the throne, despotic reigns, and rapid decay. In A.D. 232, the province was conquered by the Sassanides, who held possession of it 28 years, until Tiridates III., the rightful heir, was restored to the throne by Roman assistance.

About this time Christianity became the religion of A., which was thus the first nation to embrace the new religion. Tiridates himself had been converted by St. Gregory the Illuminator as early as about 300. The old religion of Armenia had for its basis the doctrines of Zoroaster, with a curious intermixture of Greek mythology and of ideas peculiar to the country. It is certain that the Armenians worshipped as their mightiest gods Aramazt and Mihir

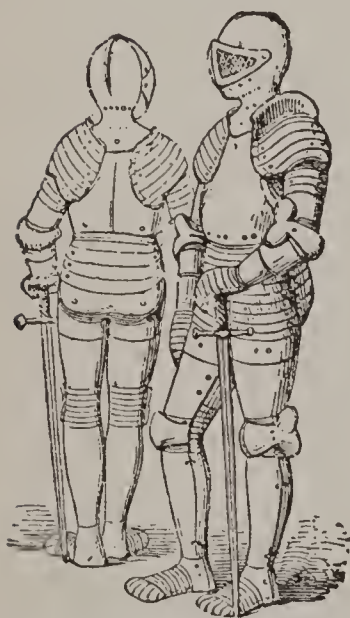


(the Ormuzd and Mithras of the old Persians); but they had also a kind of Venus, whom they styled Anaitis, and several other deities, to whom they offered animal sacrifices. This change of creed, however, made no improvement in the political circumstances of the falling state. The Byzantine Greeks on one side, and the Persians on the other, regarded A. as their prey; and in 428, Bahram V. of Persia made A. a province of the empire of the Sassanides, and with the deposition of Artasir the dynasty of the Arsacidæ was brought to a close. The rule of the Sassanides in A. was marked chiefly by their sanguinary but unsuccessful attempts to extirpate Christianity. In 632, the unhappy country was subjected to another form of despotism under the Arabian caliphs, and suffered terribly during their contest with the Byzantine emperors. In 885, Aschod I., of an old and powerful Armenian family, ascended the throne, with the permission of the caliphs, and founded the third Armenian dynasty—that of the Bagratidæ. Under them A. was prosperous till the 11th c., when divisions and internal strife began to weaken the country; till at length the Greeks, having murdered the last monarch of the Bagratidæ, seized a part of the kingdom, while the Turks and Kurds made themselves masters of the rest—only one or two of the native princes maintaining a perilous independence. In 1242, the whole of A. Major was conquered by the Mongols, and in 1472 became a Persian province. Afterwards the w. part fell into the hands of the Turkish sultan, Selim II.

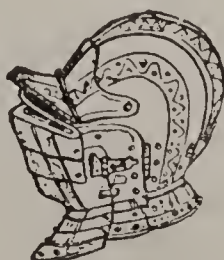
The fate of A. Minor was hardly better. The dynasty founded by Zariadres prevailed to the time of Tigranes the Great, sovereign of A. Major, who conquered the country about B.C. 70. Afterwards A. Minor was subjugated by the Romans, and made a Roman province. On the division of the empire into eastern and western, it became attached to the former, and shared in all its changes of fortune until near the close of the 11th c. At this time A. Minor—which had long been a place of refuge for many who had fled from the rage of the Turks and Persians in the sister province—was again raised to independence by Rhupen (a refugee from A. Major, and descendant of the Bagratidæ). His successors extended their dominion over Cilicia and Cappadocia, and were prominent in the Crusades. This dynasty ruled prosperously until 1374, when A. Minor was conquered by the Egyptian sultan Schaban. Since that time A., with the exception of the parts which Russia has won in the present century from Persia, and which are better governed, has remained subject to the despotism of the Turks and Persians. Notwithstanding this, the Armenians have steadily preserved their nationality, both in its physical and moral lineaments; their faith, and even—though only a relic of their ancient culture—a higher civilization than their conquerors. The political storms which devastated the country during the middle ages, and the persecutions of the Turks, have driven many of the inhabitants from their homes. This is the reason why we find them scattered over all Asia and Europe and in recent years in the United States. In Hungary,



Three-banded Armadillo (*Dasypus apar*).



Armed at all points.—From Tower of Armilause, from an illumination of London. 14th century.



Armet-grand. Armet-petit.  
Armet.



## ARMENIAN—ARMENIAN CHURCH.

Transylvania, and Galicia they number 10,000. They are very numerous in Russia, but most of all in Asia Minor, and in the neighborhood of Constantinople, where they number 200,000.

The greater part of A. is an elevated table-land. Its area is reported at 72,491 sq. m., pop. about 2,472,400. It is watered by the rivers Kur, Aras, Joruk, Euphrates, and to a slight extent by the Tigris. The lakes which lie within this mountainous region are Van, Urumiyah, and Sevan. The Armenian plateau, on the e. side of which the volcanic range of Ararat lifts itself, forms the central point of several mountain-chains, such as Taurus and Antitaurus, the mountains of Kurdistan, and those which run n. to the Black Sea. It shows many traces of volcanic agency, and even yet—as was shown by the severe earthquake of the summer of 1840, and by the total destruction of Erzroum in 1859—has an internal volcanic activity. The climate in the higher regions is hot in summer and cold in winter, but in the valleys it is more temperate. The country labors under a great scarcity of wood, and in some parts is sterile, through a deficiency of water; in other parts the soil is extremely fertile, producing rice, hemp, flax, tobacco, wine, cotton, and many varieties of fruit. Cattle breeding and grazing are more extensive than agriculture. The mountains contain iron, copper, lead, salt, and naphtha. The number of the inhabitants of pure Armenian origin is reckoned at nearly 1,000,000, but there is a large admixture of Turkomans, Greeks, Jews, Kurds, etc. The Armenians belong physically to the finest variety of the Indo-Germanic race. Their intellectual capacity is also remarkable, as is shown both by their literature and their singular dexterity in business. Still, long centuries of oppression have exerted a withering influence on their native strength of character. The n.e. portion of A., about one-third of the whole, was wrested from Persia in 1828, and is under the Russian sceptre. About a sixth part to the s.e. still belongs to Persia. The w. portion, comprising two-thirds of the Armenian area, is Turkish. After the war of 1877-78 between Russia and Turkey, the Berlin Conference sanctioned the cession to Russia of a strip of A., including Kars and Ardahan; and the sultan engaged to carry out in A. much-needed reforms, guarantee the Armenians security against the Circassians and Kurds, and undertook to report to the European powers the measures adopted. In 1894-96 terrible atrocities were perpetrated upon the Armenians in the Sasun district. In Harpoot the American and English missions were attacked and several American missionaries were killed, for whose death and property destroyed an indemnity was demanded from Turkey by the United States. A Pan-Armenian Congress met in Brussels 1902, July, and formed a Permanent International Committee to watch over Armenian interests and to promote reform.

**ARME'NIAN CHURCH:** probably established as early as the 2nd c., at the introduction of Christianity into Armenia, was not firmly established till about the end of the 3d c., when the apostolical exertions of Bishop Gregory (q.v.),

## ARMENIAN CHURCH.

converted Tiridates. See ARMENIA. The Bible was translated into the Armenian language in the 5th c. After this period great animation characterized the A. C. Numbers flocked to the colleges at Athens and Constantinople. In the ecclesiastical controversy concerning the twofold nature of Christ, the Armenian Christians held with the Monophysites (q.v.); refused to acknowledge the authority of the Council of Chalcedon; and constituted themselves a separate church, which took the title of Gregorian from Gregory himself. For several centuries a spirit of scientific inquiry, especially in theology, manifested itself among them to a far wider extent than in the other eastern churches. Their greatest divine is Nerses of Klah, belonging to the 12th c., whose works have been repeatedly published. The most recent edition was issued in Venice, 1833. The Gregorians have continued to entertain a deeply rooted aversion to the so called orthodox church. The Rom. Cath. pope at various times, especially (1145, 1341, 1440) when the Armenians accepted the help of the West against the Mohammedans, tried to persuade them to recognize the papal supremacy; but for the most part only the nobles consented to do so, while the mass of the people clung to their peculiar opinions, as we see from the complaint of Pope Benedict XII., who accuses the A. C. of 117 errors of doctrine. There is a sect of *United Armenians* in Italy, Poland, Galicia, Persia, Russia, and Marseilles. Since the formation of this body in 1835, vigorous and constant attempts, succored especially by French influence, have been made to secure the acknowledgment of the pope as the head of the Rom. Cath. portion of the A. C. When this end seemed nearer attainment than ever before, the ultramontane utterances of their representative, Mgr. Hassun, at the Ecumenical Council at Rome, 1870, in favor of infallibility, created such a reaction at home as has greatly strengthened for the present the cause of the old Gregorian party. The recent humiliation of France has further weakened the cause of the propapal party. In theology the A. C. attributes only *one* nature to Christ, and holds that the Holy Spirit proceeds from the Father alone; the latter doctrine, however, being held by it in common with the 'orthodox Greek Church,' although contrary to the theology of the western churches. With respect to the 'seven sacraments,' it entertains the peculiar notions that at baptism one must be sprinkled three times, and as often dipped; that confirmation is to be conjoined with baptism; that the Lord's Supper must be celebrated with pure wine and leavened bread; that the latter, before being handed round, must be dipped in the former; and that extreme unction is to be administered to ecclesiastics alone, and that immediately after (instead of before) their death. It believes in the worship of saints, but not in purgatory. It exceeds the Greek Church in the number of its fasts, but has fewer religious festivals. These, however, are more enthusiastically kept. Divine service is held in Turkey chiefly by night. Mass is celebrated in the old Armenian language; preaching is carried on in the new. Its sacerdotal constitution differs little from the Greek. The head of the



## ARMENIAN LITERATURE.

church, whose title is Catholikos, resides at Etshmiadzin, a monastery near Erivan, the capital of Russian Armenia. To this place every Armenian must make a pilgrimage once in his life. The monks of this church follow the rule of St. Basil. The Wartabieds form a peculiar class of ecclesiastics; they live like monks, but are devoted exclusively to learning. Secular priests must marry once, but none are at liberty to take a second wife. Missionaries from the evangelical churches in the United States have had much success among the Armenians in gathering churches, and establishing schools and colleges.

**ARMENIAN LITERATURE:** previous to the introduction of Christianity by Gregory (A. D. 300), the Armenians had adhered to the Assyrian or Medo-Persian system of culture; but excepting a few old songs or ballads, no remains of that early period exist. After their conversion to Christianity, the Greek language and its literature soon became favorite objects of study, and many Greek authors were translated into Armenian. (See Wenrich *De Auctorum Græcorum versionibus Arabicis, Armeniacis*, etc. Leipzig, 1842.) The Armenian language has an alphabet of its own, consisting of 36 letters, introduced by Miesrob in 406. The most flourishing period of A. L. extends from the 4th to the 14th c. The numerous Armenian theological writers and chroniclers of this era supply materials for a history of the East during the middle ages which have hitherto been too much neglected. These Armenian writers generally copied the style of the later Greek and Byzantine authors; but in adherence to facts and good taste, they are superior to the general order of oriental historians. In the 14th c., literature began to decline, and few remarkable works were afterwards produced; but since the time of their dispersion, the Armenians have preserved recollections of their national literature; and wherever they are found—in Amsterdam, Lemberg, Leghorn, Venice, Astrakan, Moscow, Constantinople, Smyrna, Ispahan, Madras, or Calcutta—the printing-office is always a feature in their colonies. The most interesting Armenian settlement is that of the Mechitarists (q. v.), on the island of San Lazaro, near Venice.

The Bible translated into Armenian (the Old Testament from the text of the Septuagint) by Meisrob and his scholars is esteemed the highest model of classic style. Translations of several Greek authors, made about the same time, have been partly preserved, and contain some writings of which the originals have been lost—namely, the Chronicle of Eusebius; the Discourses of Philo: Homilies by St. Chrysostom, Severianus, Basil the Great, and Ephraim Syrus. Several old geographical and historical works have been preserved. Among philosophical and theological writers may be mentioned: David, the translator and commentator of Aristotle, Esnik, and Joannes Ozniensis. The *Vitæ Sanctorum Calendarii Armeniæ* (Lives of Armenian Saints, 12 vols. Ven. 1814) contains many notices of the history of Armenia. In poetry and fiction, A. L. is poor. Somal, in his work entitled *Quadro della Storia Letteraria di Armenia* (Venice, 1829), gives a general view

## ARMENTIERES—ARMFELT.

of the contents of A. L. The Armenian belongs to the Indo-Germanic group of languages, but has many peculiarities of structure. It is harsh and disagreeable to the ear. The old Armenian, the language of literature, is no longer a living tongue; while the new Armenian, split up into four dialects, contains many Turkish words and grammatical constructions.

ARMENTIERES, *âr-môn-tě-âr'*: town of the dept. of Nord, France, on the Lys, 8 m. from Lille. The town is well built, active and prosperous, having manufactures of cotton, linen, and hemp, and a considerable trade in grain. A. was formerly famous for its cloth, cheese, and bricks. Pop. (1891) 28,638.

ARME'RIA: see THRIFT.

ARMET, n. *âr'mět* [Fr.]: helmet used in the 13th, 14th, and 15th c. ARMET-GRAND, n. an armet worn with a beaver. ARMET-PETIT, armet worn without a beaver. It had a guard for the face consisting of three bars.

ARMFELT, *ârm'fělt*, GUSTAF MAURITZ: 1757, Apr. 1—1814, Aug. 19; b. Juva, govt. of Abo; eldest son of Baron A. For services in opposing the machinations of the nobles, while officer of the Swedish royal guard, he was appointed by Gustavus III. to a post in the service of the crown prince. During the war between Sweden and Russia (1788–90), in which he was commander of one of the three divisions of the Swedish army, his courage and spirit advanced him still higher in the good graces of the monarch. He defeated a Russian force at Summa, near Fredrikshamm; and as military representative of Gustavus, had the honor of concluding a peace at Verela, 1790, Aug. 14. Gustavus, after his assassination, 1792, March 16, in the brief interval before his death, added to his will a codicil intrusting the regency to his brother, Charles, Duke of Sudermania, during the minority of Gustavus IV., naming A. governor of Stockholm, and member of the council appointed to advise with the regent. The Duke of Sudermania, however, could not brook a check upon his liberty of action, and found means to destroy the codicil. A.'s influence rapidly decreased. He was rarely permitted to see the young king; and at last, after a secret interview with young Gustavus, departed as ambassador to Naples, 1792, July. While in Italy, he entered into correspondence with certain parties in Sweden for the purpose of overthrowing the regency, and inducing the states to proclaim Gustavus IV. of age. The correspondence was discovered. A. fled to Poland, afterwards to Russia. He was condemned, during his absence, for high treason, and stripped of his goods and titles, while one of his associates, the beautiful Countess Rudensköld, was subjected to the most brutal punishment, being publicly declared 'infamous,' exposed on a scaffold for some hours, and imprisoned in a house of correction for life. A. expressed his horror of such an atrocity in language sufficiently emphatic, yet, at a later period, he did not scruple to accept office under Charles, on his election to the



throne. In 1799, Gustavus IV. received the crown at the age of eighteen, and A. was restored to all his honors. In 1805, he was appointed gov.gen. of Finland; and in 1808 he commanded the Swedish army raised for the invasion of Norway; but his plans were so completely frustrated, that he was compelled to witness the invasion of Sweden by the successful Norwegians, and was in consequence recalled and dismissed by the king. In the following year a revolution took place, Gustavus was deposed, the Duke of Sudermania elected in his place, and A. was appointed president of the Military Council. But shortly afterwards, being implicated in the poisoning of the Prince of Augustenburg, he fled to Russia, where he lived during the remainder of his life in high honor. The title of count was conferred on him, he was made chancellor of the University of Abo, president of the board of Finnish affairs, and member of the Russian senate. He died at Tzarskœ Selo, 1814, Aug. 19.

ARMIDA, *ar-mě'dă*: one of the most prominent female characters in Tasso's *Jerusalem Delivered*. As the poet tells us, when the Crusaders arrived at the holy city, Satan held a council to devise some means of disturbing the plans of the Christian warriors, and A., a very beautiful sorceress, was employed to seduce Rinaldo and other Crusaders. Rinaldo was conducted by A. to a remote island, where, in her splendid palace, surrounded by delightful gardens and pleasure-grounds, he utterly forgot his vows, and the great object to which he had devoted his life. To liberate him from his voluptuous bondage, two messengers from the Christian army—Carlo and Ubaldo—came to the island, bringing a talisman so powerful that the witchery of A. was destroyed. Rinaldo escaped, but was followed by the sorceress, who, in battle, incited several warriors to attack the hero, and at last herself rushed into the fight. She was defeated by Rinaldo, who then confessed his love to her, persuaded her to become a Christian, and vowed to be her faithful knight. The story of A. has been made the subject of an opera by Gluck and by Rossini.

## ARMIES.

**ARMIES:** armed forces under regular military organization, employed for war. An army may comprise all the military men employed by the state, or only a portion under a particular commander. When an armed force is under no constituted authority, and imperfect in organization and discipline, it cannot be said to be worthy of the name of an army, and may be little better than a horde of banditti. Of this nature are *filibusters* (q.v.). Through ages of experience, the principles of military organization, and the laws to which A. are specially amenable, have gradually reached a high degree of perfection. The primitive wars among barbarous people are always stealthy, depending on the forest and the wilderness for their tactics, and considered successful if an enemy can be attacked unawares, despoiled, and carried into slavery. After a time, war advances to the position of an art, and is conducted by men who have received a certain training. An army becomes an instrument not only for vanquishing enemies, but for seizing countries. Even then the highest position of an army is not reached; for the defense of a country requires more military skill, perhaps, and a better organization of troops, than an attack. See **ARMY** (various titles): also **ARMOR**: **ARMS**.

**ANCIENT ARMIES—*Egyptians*.**—The most extraordinary conqueror among the Egyptians, Sesostris or Rhamses, lived sixteen centuries before the Christian era; and although the evidence for his deeds of valor is questionable, there is reason to believe that the organization of his A. can be pretty accurately traced. His father, Amenophis, laid the foundation for the military glory of Sesostris. When the latter was born, Amenophis caused all the male children who were born on the same day as his son to be set apart as a special body, to be reared for a military life; they were taught everything that could strengthen their bodies, increase their courage, and develop their skill as combatants and leaders; and were to consider themselves bound as the chosen dependents or companions of the young prince. In due time Sesostris became king of Egypt; and then he formed a sort of militia, distributed as military colonists, each soldier having a portion of land to maintain himself and his family. When this militia had been drilled to military efficiency, Sesostris headed them as an army for military conquest in Asia, and placed the chosen band above mentioned as officers over the different sections of the army.

***Persians*.**—In the great days of the Persian empire, the flower of the army consisted of cavalry, who were distinguished for their bravery and impetuosity of attack. The infantry were little better than an armed mob. The war-chariots, too, though calculated to strike terror when dashing into hostile ranks, were available only on level ground. As to the numbers of men composing the great Persian A., the statements are too wild to be trustworthy. Allowing for all exaggeration, however, it is certain that the Persian A. were very large. When Darius was opposed to Alexander the Great, his army was set down at various



## ARMIES.

numbers—from 750,000 to 1,000,000 men. The king was in the centre, surrounded by his courtiers and body-guard; the Persians and Susians were on the left; the Syrians and Assyrians on the right. The foot-soldiers, forming the bulk of the army, and armed with pikes, axes, and maces, were formed in deep squares or masses; the horsemen were in the intervals between the squares, and on the right and left flanks; and the chariots and elephants in front.

*Lacedæmonians*.—The Greeks introduced many important changes in A., both in organization and in maneuvers. Every man, in the earlier ages of the country at least, was more or less a soldier, inured to a hard life, taught to bear arms, and expected to fight when called upon. The leading men in each state paid attention to organization and tactics in a way never before seen. It was not standing armies, but a sort of national militia, that gained Marathon, Plataea, and Mycale. So far as concerned the arrangement of A., the Lacedæmonians invented the *phalanx* (q.v.), a particular mode of grouping foot-soldiers. This phalanx consisted of eight ranks, one behind another; the front and rear ranks being composed of picked men, and the intermediate ranks of less tried soldiers. The number of men in each rank depended on the available resources of the commander. These men were mostly armed with spears, short swords, and shields.

*Athenians*.—The Athenians made a greater number of distinctions than the Lacedæmonians in the different kinds of troops forming their A. They had heavy infantry, constituting the men for the phalanx, and armed with spears, daggers, corselets, and shields; light infantry, employed in skirmishes and in covering the phalanx, and armed with light javelins and shields; a sort of irregular infantry, who, with javelins, bows and arrows, and slings, harassed the enemy in march, and performed other services analogous in some degree to those of sharpshooters in a modern army. It is recorded that Miltiades, the Athenian hero at Marathon, invented the 'double-quick march,' to increase the momentum of a phalanx when rushing on the enemy.

*Macedonians*.—Philip of Macedon, the father of Alexander the Great, having the sagacity to see that he could not vanquish his neighbors so long as he adopted the same formation and tactics as themselves, set about inventing something new. He resolved to have a standing army instead of a militia; to have at command a set of men whose trade was fighting, instead of citizens who were traders and soldiers by turn. As a further change, he made the phalanx deeper and more massive than it had been among the Lacedæmonians. He brought into use the Macedonian pike, a formidable weapon 24 ft. in length. With a phalanx sixteen ranks in depth, four rows of men could present the points of their long pikes protruding in front of the front-rank, forming a bristling array of steel terrible to encounter. Besides these heavy infantry, there were light troops marshalled into smaller bodies for more active maneuvers. Philip organized three kinds of cavalry—heavy, armed with

## ARMIES.

pikes, and defended by cuirasses of iron mail; light, armed with lances; and irregular.

*Thebans.*—This nation introduced the army-formation of *columns*, much deeper than broad, or having more men in file than in rank. A new kind of tactics was introduced in accordance with this formation; the movement being intended to pierce the enemy's line at some one point, and throw them into confusion.

*Romans.*—These able warriors initiated changes in army matters, which had wide influence on the nations of the civilized world. About 200 B.C., every Roman, from the age of 17 to 46, was liable to be called upon to serve as a soldier; the younger men were preferred; but all were available up to the middle-time of life. They went through a very severe drilling and discipline, to fit them alike for marching, fighting, camping, working, carrying, and other active duties. Every year the senate decreed the formation of *legions*, or army corps, deputing this duty to the consul or pretor. Magistrates sent up the names of eligible men, and tribunes selected a certain number from this list. See **LEGION**. The Roman legion, in its best days, had many excellent military qualities—great facility of movement; a power of preserving order of battle unimpaired; a quick rallying-power when forced to give way; a readiness to adapt itself to varying circumstances on the field of battle; a formidable impetuosity in attack; and a power of fighting the enemy even while retreating. The heavy infantry were armed with javelins, heavy darts, pikes, and swords; the lighter troops with bows and arrows, slings, and light javelins; while the defensive armor comprised shields, cuirasses, helmets, and greaves.

Those ancient nations which had no distinctive features in their A. are not noticed here.

**MEDIÆVAL ARMIES.**—The downfall of the Roman empire marked the dividing-point between ancient and mediæval times in military matters, as well as in other things that concern the existence of nations. The barbarians and semi-barbarians, who attacked on all sides the once mighty but now degenerate empire, gradually gained possession of the vast regions which had composed it. The mode in which these conquests were made gave rise to the *Feudal System* (q.v.). What all had aided to acquire by conquest, all demanded to share in proportions more or less equal. Hence arose a division of the conquered territory; lands were held from the chief by feudal tenure, almost in independent sovereignty. When European kingdoms were gradually formed out of the wrecks of the empire, the military arrangements took on a peculiar form. The king could not maintain a standing army, for his barons or feudal chieftains were jealous of allowing him too much power. He could only strengthen himself by obtaining their aid on certain terms, or by allowing them to weaken themselves in intestine broils, to which they had always much proneness. Each baron had a small army composed of his own militia or retainers, available for battle at short notice. The contests of these



## ARMIES.

small armies, sometimes combined and sometimes isolated, make up the greater part of the wars of the middle ages. Of military tactics or strategy, there was very little; the campaigns were desultory and indecisive; and the battles were gained more by individual valor than by any well-concerted plan.

One great exception to this military feudality was furnished by the *Crusades* (q.v.). So far as concerns A., however, in their organization and discipline, these expeditions effected but little. The military forces which went to the Holy Land were little better than armed mobs, upheld by fanaticism, but not at all by science or discipline. Numbers and individual bravery were left to do the work, combination and forethought being disregarded.

A much greater motive-power for change, during the middle ages, was the invention of gunpowder. When men could fight at a greater distance than before, and on a system which brought mechanism to the aid of valor, everything connected with the military art underwent a revolution. Historically, however, this great change was not very apparent until after the period usually denominated the middle ages. The art of making good cannon and hand-guns grew up gradually, like other arts; and A. long continued to depend principally on the older weapons—spears, darts, arrows, axes, maces, swords, and daggers.

During the greater part of the 14th and 15th centuries, the chief A. were those maintained by the Spaniards and the Moors on one European battle-ground, by the English and the French on another, and by the several Italian republics on a third. In those A., the cavalry were regarded as the chief arm. The knights and their horses alike were frequently covered with plate or chain armor; and the offensive weapons were lances, swords, daggers, and battle-axes. A kind of light cavalry was sometimes formed of archers on smaller horses. As to army-formation, there was still little that could deserve the name; there was no particular order of battle; each knight sought how he could best distinguish himself by personal valor; and to each was usually attached an esquire, abetting him as a second during the contest. Sometimes it even happened that the fate of a battle was allowed to depend on a combat between two knights. No attempt was made, until towards the close of the 15th c., to embody a system of tactics and maneuvers for cavalry; and even that attempt was of the most primitive kind. Nor was it far otherwise with the foot-soldiers; they were gradually becoming acquainted with the use of firearms; but, midway, as it were, between two systems, they observed neither completely; and the A. in which they served presented very little definite organization.

MODERN ARMIES.—The formation of *standing* armies may be said to have introduced the modern military system. When the remarkable exploit of Jeanne d'Arc (Joan of Arc) had enabled Charles VII. to check the victorious progress of the English in France, he set about remodelling his army. By gradual changes, amid

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great difficulty, he converted his ill-governed forces into a disciplined standing army. During the reign of his son, Charles VIII. (1483-98), the consequences of this change made their appearance. Charles conducted a well-appointed army into Italy (1494), in support of some pretensions which he had to the throne of Naples.

The change made by Charles VII. was not simply that of substituting a compact standing army for an ill-organized medley of feudal troops and of mercenaries; feudalism itself gave way under the influence of this combined with other reforming agencies. So far as concerned the actual formation and discipline of the standing A. above noticed, a few changes were from time to time introduced: pistols and carbines were given to the cavalry; cuirasses were worn by the heavy troopers; and new evolutions were introduced. During the 'Thirty Years' War (1618-48), Gustavus Adolphus and Wallenstein adopted opposite modes of dealing with masses of infantry: the former spread them out to a great width, and only six ranks in depth; whereas the latter adopted a narrower front, with a depth of twenty to thirty ranks. Frederick the Great, in the next century, introduced a most complicated system of tactics and drilling; insomuch that when he could maneuver, he nearly always won his battles; but when the result depended on bold and unexpected onslaughts, he was more frequently a loser than a winner. The great military leader in the early part of the present century, Napoleon Bonaparte, made a larger use than any previous European general of the method of moving masses of troops with great celerity, beating the enemy in detail before they could combine in one spot.

It is desirable to present, in the most condensed form, a few statistics of the actual A. of Europe; leaving to titles of the several countries, cities, and battle-fields, all details concerning special armies and military encounters.

The army forces of all the countries of the world 1903 were as follows.

*Argentine Republic:* 20 generals, 276 field officers, 880 subalterns, 238 engineers, 789 artillerists, 2,227 horse, 2,321 foot—total 5,585 combatants. Militia 236,000 men of 17-45 years. There was a milit. school with 125 cadets, and a school for non-commissioned officers.

*Austria-Hungary:* on peace footing, inf. 240,461, cav. 55,387, artil. 40,401, technical troops 10,148, train 3,906, sanitary 4,698, higher officers 4,394, establishment, etc., 15,501—total 374,148. On the war footing the total strength was 2,580,000. The yearly contingent of recruits for the army amounted to 103,100. Milit. service begins at 21 years, and the men serve 3 years in the line and 7 years in the reserve. Horses (peace) 66,758, (war) 332,000.

*Belgium:* (peace) inf. 29,709, cav. 6,140, artil. 9,315, engineers 1,855, gendarmerie 3,144, gen. staff, train, administrative, milit. school, etc., 1,481—total 51,644; horses, 10,908. War footing, 143,000 men, 28,600 horses. Beside



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the army, there was a 'civic guard' organized in communes of 10,000 inhabitants.

*Lolivia*: 2,560 men, 140 officers in actual service: all citizens are bound to serve in the 'national guard.'

*Brazil*: (1891) 28,877 men, 1,600 officers, 20,000 gendarmerie.

*British Empire*: regular army (exclusive of India) 9,975 commissioned officers, 1,510 warrant officers, 20,050 sergts., 4,542 drummers, fifiers, etc., 183,623 rank and file—total 219,700; horses, 26,303. The organized milit. forces of colonies, dependencies, etc., of Great Britain were as follows: *Honkong*, 4,437 (colonial 2,364). *India* (European army), 74,328 officers and men; (native army), 147,552—total 221,880. *Straits Settlements* (for the Straits Settlements and all other colonies and dependencies only the local forces are enumerated here. The imperial forces are included in the total for the whole empire), armed police force of 2,751, volunteer artil. 105 officers and men. *Cape Colony*, mounted riflemen, 1,003, Cape police, 1,952, 609 horses; every able-bodied man 18–50 years old is subject to milit. service both beyond as well as within the colonial limits. *Zanzibar*, 900 men. *Canada*, volunteer force of 38,090 officers and men. *Jamaica*, volunteer militia 1,741. *New South Wales*, regular milit. force 688, 5,194 volunteers, 3,063 reserves. *New Zealand*, volunteers, 20,230, permanent militia artil. force of 216 officers and men; all males of 17–55 years liable to serve in the militia. *Queensland*, drilled force of 4,976 men; males 18–60 years are subject to milit. duty. *S. Australia*, militia force of 2,318, and volunteers 777, artil. corps 52. *Tasmania*, volunteers 2,430 officers and men. *Victoria*, organized force of 11,817. *W. Australia*, volunteer force of 2,125 officers and men.

*Bulgaria*: see *Turkish Empire*.

*Canada*: see *British Empire*.

*Cape Colony*: see *British Empire*.

*Chile*: 2 regts. artil., 1 battalion coast artil., 1 of sappers, 8 of inf., 3 of cav.—total 17,385 officers and men; national guard 48,530.

*China*: men of all arms 980,000.

*Colombia, Republic of*: peace footing 1,000 men. Every able-bodied man liable to milit. service.

*Costa Rica*: 600 men; militia 12,000 men.

*Denmark*: total war strength 60,134, exclusive of the extra reserve, numbering 16,500.

*Dutch East Indies*: see *Netherlands*.

*Ecuador*: 3,341 officers and men; national guard 30,000.

*Egypt*: see *Turkish Empire*.

*France*: in the active home army there were 513,998 officers and men, of whom 489,392 were in the regular army, the rest in the gendarmerie and the garde republicaine; there were 126,155 horses. The army of *Algeria* comprised 53,761 regular troops, 1,013 gendarmerie, and the number of horses is 12,737. In *Tunis* were 18,371 men in the regular army, 143 in the gendarmerie; horses 3,931. Total men and officers at home and in *Algeria* and *Tunis*

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557,286 men and officers, and 142,823 horses. The territorial army numbered 37,000 officers and 579,000 men. All these forces, with the reserves, amount to about 2,500,000 soldiers; and including all able-bodied men, France could reckon on a grand total of 4,350,000 men (see FRANCE).

*German Empire:* regular army comprised 24,292 officers, 581,519 rank and file, 105,143 horses. No official statement has ever been published of Germany's war strength, but the 'intelligence division' of the British war office (1888) compiled the following table (which includes in the first table of figures the 'regular' army):

|                      | FIELD ARMY.    |                 |           | Garrison army. | Grand total. |
|----------------------|----------------|-----------------|-----------|----------------|--------------|
|                      | Active troops. | Reserve troops. | Total.    |                |              |
| Officers.....        | 22,377         | 9,536           | 31,913    | 16,269         | 48,122       |
| Surgeons.....        | 4,247          | 1,300           | 5,547     | 2,055          | 7,602        |
| Other officials..... | 7,928          | 1,933           | 9,861     | 3,096          | 12,957       |
| Rank and file.....   | 942,408        | 354,915         | 1,297,323 | 868,627        | 2,165,950    |
| Horses.....          | 280,472        | 72,963          | 353,435   | 86,324         | 439,759      |

To this grand total of men and officers add railroad staff and special services and (in case of invasion) the landsturm (700,000), and the result falls little short of 3,000,000 men (see GERMANY).

*Great Britain and Ireland:* see *British Empire*.

*Greece:* standing army of 22,104 officers and men, and 3,227 horses. The reserves numbered 82,000, and the territorial army 96,000 men.

*Guatemala:* army of 3,718 officers and men, the reserve militia had 67,300.

*Haiti:* regular army of 6,828 officers and men; there was also a 'guard of the govt.,' numbering 650 men, commanded by 10 generals.

*Honduras:* active army of 500 men; the militia numbered 20,000.

*India:* see *British Empire*.

*Italy:* under arms 261,976 officers and men, and 486,290 officers and men 'on permanent leave;' the 'mobile' militia numbered 320,170, and the 'territorial' 2,285,875, grand total 3,356,920.

*Japan:* peace strength, 8,046 officers, 158,214 rank and file, 31,057 horses; the reserve had a strength of 204,109, and the landwehr of 98,722 men.

*Kongo Free State:* authorized force, 13,650 natives, commanded by European officers.

*Madagascar:* standing army estimated at 15,697 officers and men.

*Mexico:* total strength 32,143 officers and men. The effective reserve force was stated to be 120,500 inf., 20,000 dragoons, 6,000 artil. All men capable of bearing arms, 20-50 years old, were subject to milit. service.

*Monaco:* no army, only a 'guard of honor'—75 men and officers.

*Montenegro:* law requires that all men 17-60 years old, capable of bearing arms, be trained as soldiers, and they are liable to milit. service.



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*Morocco*: about 10,000 inf. soldiers and 400 cav., beside 2,000 irregular cavalry.

*Netherlands*: regular army of about 27,366 officers and men. In the *Dutch East Indies* the army is pure colonial, and numbers about 38,165 officers and men.

*Nicaragua*: active army of 2,000 men, with a reserve of 10,000 and national guard of 5,000.

*Norway*: active army of about 50,000 men, reserve included.

*Orange River Colony*: no standing army, but every able-bodied man is compelled to take up arms when necessity demands it.

*Paraguay*: army comprised 82 officers, 1,500 men. Men aged 20–35 years are liable to milit. service.

*Persia*: milit. establishment comprised 105,500 men, but of these less than 25,000 were in active service.

*Peru*: total force 4,000 men.

*Portugal*: standing army of 33,068 officers and men. In Portuguese colonies there is an army of 8,880 officers and men.

*Roumania*: peace establishment 3,280 officers, 388 employés, 60,000 men, 11,930 horses; territorial army comprised 72,000 men, 7,500 horses.

*Russia*: army on peace footing numbered (regular troops) 1,314,298, with 172,445 horses; (Cossacks) 58,500 with 45,500 horses; militia 3,500 with 3,000 horses—grand total 1,386,810 officers and men. On the war footing the strength in men was 4,600,000, and in horses 562,000.

*Salvador*: army of 4,000 men and 25,000 militia.

*Santo Domingo*: small army of inf., cav., and artillery.

*Servia*: standing army about 22,448 men; the three classes of reserves raise the milit. strength to 300,000 men.

*Siam*: small standing army; all male inhabitants are required to serve the state in camps three months in each year.

*South African Republic*: only a small force of horse artil.; the able-bodied men liable to milit. duty numbered about 40,000.

*Spain*: army on peace footing numbered 119,432, on war footing 213,972.

*Sweden*: standing army of 37,200 officers and men, 9,808 horses.

*Switzerland*: army divided into three classes, viz.; élite 153,649, landwehr about 88,813, landsturm about 283,643; in the élite were enrolled all men aged 20–32 years capable of bearing arms; in the landwehr all 32–44 years; in the landsturm all citizens not otherwise serving aged 17–50 years.

*Turkish Empire*: milit. service required of all the Musulman population: strength of the active army about 9,000 officers and 205,000 men. Among the tributary states *Bulgaria* had an army of 35,800 men on peace footing, and 125,000 on war footing. *Egypt's* army numbered about 18,068 men.

*United States*: regular army numbered (1901, Feb.) 100,000 officers and men. The organized militia (or 'national

## ARMIGER—ARMILLA.

guard' of the several states) numbered nearly 2,000 officers and 183,596 men. All men aged 18-45 years are liable to do milit. duty at the call of the president. The number of males of milit. age (1900) was 16,360,363. See UNITED STATES ARMY.

*Uruguay*: standing army of 3,504 officers and men, an armed police of 3,200, and an active civilian force of 97,000.

*Venezuela*: standing army numbered 9,000 men.

**ARMIGER**, n. *âr'mî-jér* [L. *armiger*, bearing or carrying weapons—from *arma*, arms; *gero*, I carry]: in *her.*, esquire; one with a right to armorial bearings. **ARMIGEROUS**, a. *âr-mîj'ér-üs*, bearing arms.

**ARMIL**, n. *ârm'il* [L. *armilla*, a bracelet—from *armus*, the arm]: an ancient astronomical instrument consisting of one, two, or more rings placed in the plane of the equator, or in the plane of the meridian; a kind of a sun-dial.

**ARMILAUSA**, n. *âr-mî-law'za* [L. *armiclausula*, a military cloak]: cloak covering the shoulders, worn in England in mediæval times.

**ARMILLA**, n. *âr-mîl'lă* [L. *armil'la*, an ornament for the arm, a hoop]: in *mech.*, an iron ring, hoop, or brace; in *anat.*, the circular ligament of the hand. **ARMILLATED**, a. *âr'mîl-lă-těd*, wearing bracelets. **ARMILLARY**, a. *âr'mîl-lér-î*, consisting of rings or circles; applied to an artificial sphere composed of a number of circles or movable rings; appearing in the form of several rings or bracelets put together in due position. The **ARMILLARY SPHERE** is an instrument intended to give a just conception of the constitution of the heavens, and of the motions of the heavenly bodies, as seen by an observer on the earth. It consists of a number of rings fixed together so as to represent the principal circles of the celestial sphere, and these are movable round the polar axis within a meridian and horizon, as in the ordinary celestial globe. It was by means of such rings furnished with sights that Hipparchus, Ptolemy, and other ancient astronomers made many of their observations, and we find even Tycho Brahé making most of his planetary observations with the help of such an instrument. It is, however, now used only as an aid to instruction in astronomy, and in this respect is generally supplanted by the celestial globe. The object of the Armillary Sphere will be better understood by reference to the celestial globe in the diagram. Supposing the observer on the earth to be in the centre of the sphere, the earth on which he stands shuts out from his view the lower half of the heavens, or the part lying below the horizon, HH. The hemisphere above him may be regarded as divided into two equal portions, an eastern and a western, by the meridian, MM, which passes through the pole, P, and the zenith, Z, of which the eastern half is shown in the figure. The north pole is supposed to be elevated above the horizon, and its elevation is measured by the arc NP, or the height above the north point; and the heavens appear to rotate round an axis, PQ, of which P is one extremity; the south pole, Q, the other extremity.



being below the horizon. The meridian MM, and the horizon HH, are the only circles which maintain a fixed position with regard to the observer. Of the other leading



celestial circles, the equator or equinoctial, LL, extending from the east to the west point of the horizon, the tropics of Cancer and Capricorn, respectively BB and CC, and the Arctic circle, AA, although rotating with the stars, maintain the same position with regard to the horizon; while the ecliptic, KK, is constantly changing its inclination and position towards it. Circles which extend from pole to pole, cutting the equator at right angles, are called circles of declination. The circle which passes through the vernal equinox  $\gamma$  (see ARIES), is denominated the equinoctial colure; and that passing through the summer solstice, O (see SOLSTICE), the solstitial colure. The circles just named, together with the Antarctic circle, are represented by corresponding rings in the Armillary Sphere. If S be a star, the following are the names given to the arcs which determine its position with regard to these circles:  $\gamma$  V, Right ascension; SV, Declination; SP, Polar distance; SZ, Zenith distance; XS, Altitude;  $(XN + 180^\circ)$ , Azimuth, reckoned from the south pole westward.

ARMINIAN, n. *är-mĭn'ĭ-ăn* [from *Armin'ius*] one who holds the doctrines of Jacobus Arminius (q.v.): ADJ. pertaining to the doctrines of Arminius. ARMIN'IANISM, n. *-ĭ-ăn-ĭzm*, the peculiar doctrines of Arminius (q.v.).

ARMINIUS: famous German hero: 6th c.: see HERMANN, or HERMAN.

## ARMINIUS.

ARMINIUS, *âr-mî'nî-ÿs*, JACOBUS, the founder of Arminianism: 1560-1609, Oct. 19; b. at Oudewater (Old Water). His real name in Dutch was James Harmensen; but in accordance with the prevailing custom among scholars in those days, he latinized it. His father was a cutler, and died when A. was a child. After a preliminary education at Utrecht, he commenced (1575) a course of study at the newly founded Univ. of Leyden, where he remained for six years, and where he seems to have acquired a high reputation, for the Amsterdam merchants undertook to bear the expense of his further studies for the ministry, on condition that he would not preach out of their city unless permitted to do so. In 1582, he went to Geneva, and received the instructions of Theodore Beza, the most rigid of Calvinists. Here he made himself odious by the boldness with which he defended the logic of Peter Ramus, in opposition to that of the Aristotelians of Geneva, and in consequence had to retire to Basle, whither his fame must have preceded him, for he was ordered by the faculty of divinity in that univ. the degree of doctor gratis, which, however, he did not venture to accept, on account of his youth. At Basle he studied under Gyrnæus. He subsequently (1586) travelled into Italy. On his return to Amsterdam (1588), he was appointed minister. Shortly after this, he was commissioned to defend the doctrine of Beza, regarding predestination, against the changes which the ministers of Delft had proposed to make on it. A. carefully examined both sides of the question, but the result of his study was that he himself began to doubt, and at last came to adopt the opinions he had been commissioned to confute. Some time after this change of view, he came, in the course of his expositions, to the Epistle to the Romans, the most explicitly doctrinal in the New Testament, the 8th and 9th chapters of which have always been considered the strongholds of Calvinism. His treatment of this epistle excited much dissatisfaction, and involved him in sharp disputes with his orthodox brethren. Still his views were, as yet, either ambiguously or vaguely expressed, or, at least, had not attained consistency, for in 1604 he was made professor of theology in the Univ. of Leyden.

The greatest enemy of A. was Francis Gomar, his colleague in the Univ. of Leyden. In the course of the year 1604, the latter attacked his doctrines, and from that hour to the end of his life, A. was engaged in a series of bitter disputes with his opponents. The *odium theologicum* was perhaps never exhibited in more unmingled purity. Arminius asserted, in substance, that God bestows forgiveness and eternal life on all who repent of their sins and believe in Christ; he wills that all men should attain salvation, and only because he has from eternity foreseen the belief or unbelief of individuals, has he from eternity determined the fate of each. On the other hand, Gomar and his party, appealing to the Belgic Confession and the Heidelberg Catechism, maintained that God had, by an eternal decree, predestinated what persons shall, as



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Being elected to salvation, be therefore awakened to repentance and faith and by grace made to persevere therein; and what persons shall, as being rejected (*reprobati*), be left to sin, to unbelief, and to perdition. See PREDESTINATION: PERSEVERANCE OF SAINTS.

While these fierce disputes were continuing, A. who was not destitute either of friends or influence, was made *rector magnificus* of the univ., but resigned the honor, 1606, Feb. 8, having held the office only one year. All the pulpits in Holland now fulminated against him. At length, 1608, A. himself applied to the states of Holland to convoke a synod for the purpose of settling the controversy; but, worn out with care and disease, he died before it was held, leaving seven sons and two daughters by his wife, Elizabeth Reael, daughter of Laurent Reael, a judge and senator of Amsterdam.

There can be no doubt that A. himself was much less Arminian than his followers. He had not matured his opinions sufficiently to elaborate a complete system of anti-Calvinistic doctrine, though it is perfectly certain that the conclusions at which his disciples arrived—as stated in the famous ‘Five Articles’—are the logical and legitimate results of his teaching. He always complained, however, that his opinions were misrepresented; but this is invariably the fate of controversialists, and the penalty of controversy. A. was an extremely good man, as even his enemies allow; his abilities were also of a high order; his thinking is clear, bold, and vigorous; his style remarkably methodical, and, his scholarship respectable, even though not profound.

After the death of A., his followers gained strength, and boldly asserted their views, but still remained a minority. In 1610, they presented to the assembled states of the province of Holland a ‘Remonstrance’—from which they were styled ‘Remonstrants’—which contained the following propositions: 1. That God had indeed made an eternal decree, but only on the conditional terms that all who believe in Christ shall be saved, while all who refuse to believe must perish; so that predestination is only conditional. 2. That Christ died for all men, but that none except believers are really saved by his death. The intention, in other words, is universal, but the efficacy may be restricted by unbelief. 3. That no man is of himself able to exercise a saving faith, but must be born again of God in Christ through the Holy Spirit. 4. That without the grace of God, man can neither think, will, nor do anything good; yet that grace does not act in men in an irresistible way. 5. That believers are able, by the aid of the Holy Spirit, victoriously to resist sin; but that the question of the possibility of a fall from grace must be determined by a further examination of the Scriptures on this point.

This last point, left as an open question, was decided by the Remonstrants in the affirmative soon afterwards (1611). Whereupon the Gomarists (Calvinists) put forth a strong ‘Counter-remonstrance,’ asserting plainly absolute predestination and reprobation. After several fruitless discus-

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sions, the states of Holland, 1614, Jan., acting under the advice of Oldenbarneveld, a senator, and the learned Hugc Grotius, issued an edict of full toleration for both parties, prohibiting at the same time the continuance of the controversy. The Counter-remonstrants (or Calvinists) refused to submit to this edict, and the strife soon became so furious that in 1617, or soon afterwards, the Arminians found it necessary to guard themselves from personal violence by appointing a safeguard of militia-men (*Waardgelders*). The controversy now merged in the strife of party politics. The ambitious Maurice of Orange took advantage of the passions of the majority to crush his opponents of the republican party, whose leaders were adherents of the Arminian doctrines. Several Arminians were put to death—among them the aged senator Oldenbarneveld, 1619, May 13—while Grotius and others were imprisoned. In these circumstances, the Synod of Dort was held (1618–19), attended by selected representatives from the Netherlands, England, Scotland, the Palatinate, Switzerland, Nassau, East Friesland, and Bremen. From this convocation, 1619, Jan. 14, the thirteen Arminian pastors, with the learned and eloquent Simon Episcopius at their head, were excluded. The doctrines of the Counter-remonstrants were embodied in 93 canons; the Belgic Confession and the Heidelberg Catechism were confirmed as authorities for the reformed churches of the Netherlands; and 300 Arminians (chiefly preachers) were expelled from office. In consequence of this decision, the defeated party sought shelter in France, Holstein, England, etc. Afterwards, under Frederick Henry, the stadtholder after Prince Maurice (1630), they were again tolerated in Holland, and in 1634 Episcopius opened his theological college in Amsterdam.

Since that time, the Remonstrants (or Arminians) in Holland have inclined more and more towards freedom of thought on religious questions and independence in church government. The rejection of all creeds and confessions; the free interpretation of the Scriptures; a preference of moral to doctrinal teaching; Arian views respecting the Trinity; the virtual rejection of the doctrines of original sin and imputed righteousness, and the view of the sacraments as merely edifying forms or ceremonies: all these and other points of belief display the same tendency which is found in their church polity. Their annual conference on ecclesiastical affairs is composed of ministers and lay-deputies, and meets in June, alternately at Amsterdam and Rotterdam. The number of Remonstrants is now only about 5,000, and is decreasing. In 1809, they had 34 congregations with 40 preachers in Holland; but in 1880, only about 20 congregations. The largest society of Arminians is in Rotterdam, and numbers only 600 members.

Although the Arminians are thus dwindling away as a distinct body, their tenets respecting predestination have been adopted with greater or less modification by several great modern Christian denominations (see METHODISTS: BAPTISTS); as well as by multitudes of the individual mem-



## ARMIPOTENCE—ARMITAGE.

bers of those churches whose formularies are Calvinistic. See CALVINISM. They are also very prevalent in the Church of Rome.

**ARMIPOTENCE**, n. *âr-mîp'ô-těns* [L. *arma*, weapons of war; *potens*, powerful]: power in arms. **ARMIP'OTENT**, a. powerful in arms.

**ARMISONANT**, a. *âr-mîs'ô-nănt*, or **ARMISONOUS**, a *âr-mîs'ô-nûs* [L. *arma*, arms; *sonans*, sounding]: having sounding arms, or rustling armor.

**ARMISTICE**, n. *âr'mîs-tîs* [F. *armistice*—from L. *arma*, arms; *sisto*, I stand still]: a cessation from hostilities between armies, or nations, for a short time; a truce. It sometimes takes place when both sides are exhausted, and at other times when an endeavor to form a treaty of peace is being made. A particular example will best illustrate the nature of an A. The representatives of England, France, Austria, Prussia, Sardinia, Turkey, and Russia, met in congress at Paris, 1856, Feb. 25, to consider the terms of a treaty of peace, which should terminate the 'Crimean' between five of the powers. It was agreed at the first sitting that an A. should be declared, to be announced by telegraphic message to the commanders in the Crimea, and to last until Mar. 31. During that period of about one calendar month, the hostile armies were to remain strictly at peace, though the fleets of the allies were to continue their blockade of Russian ports. The information reached the generals late on Feb. 28. On the morning of the 29th, a white flag was hoisted in the Russian camp outside Sebastopol; several Russian officers assembled around it; and a glittering cavalcade of British, French, and Sardinian officers proceeded thither. The accredited officers compared notes, found the terms of the A. clear, agreed on a boundary-line between the hitherto hostile forces, and formally gave pledges for a cessation of fighting. The courtesy of civilized nations at once succeeded to the horrors of war; the Russian commander gave a magnificent entertainment to the allied commanders, and was entertained in turn; the soldiers 'fraternized,' by little gifts of tobacco, and ludicrous attempts at conversation, across a small stream which formed part of the boundary-line. The A. ended Mar. 31 with a treaty of peace.

**ARMITAGE**, *âr'mî-těj*, THOMAS, D.D., LL.D.: Baptist minister: b. Pontefract, England, 1819, Aug. 2. He was a Wesleyan preacher from his youth, but came to New York 1838 and joined the Meth. Episc. Church. Ten years later he entered the Bapt. denomination and became pastor of the 5th Ave. Bapt. church, New York. He became eminent and popular as a preacher and orator, and at the same time widely known as one of the leading theological writers. He was one of the founders of the American Bible Union, and at one time its pres. He interested himself deeply in the revision of the Scriptures. In 1889 he retired from his pastorate. He wrote *Lectures on Preaching: Its Ideal and Inner Life* (1880); and *A History of the Baptists* (1886). He died 1896, Jan. 20.

## ARMOR.

ARMOR, or ARMOUR, *n.* *ár'mér* [OE. *armure*; F. *armure*; OF. *armeure*, armor—from L. *armatūra*, armor, equipment—from *arma*, arms]: dress for war made of iron or steel; weapons of war. ARMORER or ARMOURER, *n.* *ár-mér-ér*, one who makes weapons of war. ARMORIAL, *a.* *ár-mō'rĭ-ăl*, belonging to arms; pertaining to coats of arms; heraldic. AR'MORIST, *n.* one skilled in heraldry. ARMORY, or ARMOURY, *n.* *ár'mō-rĭ*, a place where weapons of war are kept, or where they are made; a storehouse for arms; a collection of ancient armor and weapons—such as those in the Tower of London, in Sir Samuel Meyrick's mansion at Goodrich Court on the Wye, and in Warwick Castle. The term is applied also to armorial bearings. AR'MOR-BEARER, one who carries the arms of a soldier of rank. AR'MOR-PLATED, *a.* *-plā-těd*, covered with defensive plates of metal, as ships of war. ARMOR is a general name for the apparatus for personal defense as contradistinguished from arms or weapons of offense. Little of it is worn by soldiers at the present day, as hand-to-hand conflicts, in which it is especially serviceable, are not the common mode of modern warfare. It was before the invention of gunpowder that A.—often called in England *harness*—was especially used.

All the ancient nations who occupy a place in history were accustomed to adopt one or other of the defensive clothing or implements which collectively come under the denomination of A. Leather A. was sometimes worn; but brass, iron, and other metals were preferred. Some of the more luxurious leaders had much silver and gold in their A. In the Bible, shields, helmets, breastplates, and greaves are mentioned among the articles of A. borne or worn by the Israelites and their opponents. The classical writers—Homer, Xenophon, Herodotus, Livy, Tacitus, Varro, etc.—supply abundant evidence of the use of A. among the nations concerning whom they wrote.

It is believed that the early Britons bore little or no other A. than shields. The Anglo-Saxons were more fully provided. At different times before the Norman Conquest they appear to have had four-cornered helmets; loriceæ made of leather; scale-A.; leathern helmets; wooden shields covered with leather; sheep-skin shields; conical caps or helmets of metal; pectorals or neck-guards; breast-guards of undressed hide; flat-ringed A.; byrnes or tunics of overlapping pieces of leather; close-fitting cuirasses of leather, and sometimes of strong linen; leg-guards of twisted woolen cloth; shields of various sizes, from half a yard to a yard and a half in length; and casques having more or less resemblance to the ancient helmets. When the Danes were in Britain, they had at first no other A. than leathern neck-pieces, which descended some way over the shoulders and chest; and greaves or shin-pieces for the legs. In the time of Canute or Knute, however, they adopted a kind of A. which Sir Samuel Meyrick supposes them to have borrowed from the Norsemen or Norwegians. It comprised a tunic, with a hood and long sleeves; pantaloons which covered feet as well as legs; and sugar-loaf



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shaped helmets or skull-caps, with attached pieces which hid nearly the whole face except the eyes. All these were probably made of leather; but most of the surfaces were strengthened by macles or mascles, a perforated net-work of steel.

With William the Conqueror came in the kinds of A. which were at that time prevalent among the knights and soldiers of the continent of Europe, and which became afterwards more or less combined with the A. previously known in England. William himself occasionally wore a hauberk of ring-A. This kind of A. was much worn during his reign, the rings being usually attached to a foundation of leather. One curious variety of ring-A., called the *haubergeon*, had the tunic and breeches all in one piece. The helmets were generally conical, with a nasal or nose guard descending from the front. A distinct ring-A., called *hose*, was often worn on the legs. The shield was generally kite-shaped, unlike the oval shields carried by the Anglo-Saxons. Gradual changes in these various portions of A. were made between the reigns of William Rufus and John. In the time of Henry III. were stitched



Suit of Armor, presented by the Emperor Maximilian to Henry VIII.

and padded hauberks and chaussés, called '*ouvrages de pourpointerie*'; suits of ring-A.; greaves or shin-pieces of steel; poleyns or knee-guards; vambraces or arm-guards, jacks, jaques, or jackets, made of leather, and worn over the ring-A.; interlaced ring-A., of oriental invention, not requiring to be stitched to any garment or foundation; helmets, visors, and skull-caps of various forms; and chanfrons, or A. for the head and face of horses. During Edward III.'s reign, iron plate-A. was much used by troopers, in the various forms of helmet, breast-plate, gauntlet, and greaves. In the 14th c., chain-mail fell into disuse, and was succeeded by plate-A.; this last-named kind became more and more complicated, and reached its greatest pitch of elaboration in the reign of Richard III. During the times of Henry VII. and VIII., the A. was sometimes fluted, often elaborately engraved, and even damascened or inlaid with gold. Under James I., the knightly ideas

## ARMORACIA—ARMORIC.

of the feudal times gave way, and the use of A. declined; a knight armed *cap-à-pie* was a rarity. Charles I. tried in vain to revive its use; and the days of Cromwell were the last in which A. was much worn by the regular soldiers, though helmets and cuirasses are still worn by certain cavalry corps, more for show than for service.—For the chief pieces of A., see the proper titles. For other applications of the term A., see ARMOR-PLATES: DIVING-DRESS.

AR'MORER, or ARMOURER: a word whose old meaning has nearly passed away with the system to which it belonged. The armor-smiths, or makers of armor, were among the most skilful workers in metal during the feudal times; but their trade afterwards fell away. In the year 1690, the workmen-armorers of London, in a petition to parliament, complained that their trade was well-nigh ruined.

Armorers, in a somewhat different sense of the word, belong to some modern armies and navies: in some armies there are armorers to every regiment, or battalion, or brigade, not to make armor, but to repair arms.

On shipboard the A. is a first-class petty officer, who has, under the gunner, charge of all the muskets, pistols, cutlasses, boarding-pikes, etc., which he is expected to keep clean and in ready order. He is assisted by certain seamen called the 'A.'s crew'; and all are skilled in the general routine of smith's work.

ARMOR-PIERCING PROJECTILE: a steel shell designed to pierce the steel armor with which modern war vessels are protected. They are turned from the finest grade of steel, selected for two seemingly contrary purposes, toughness and brittleness. A shell must be tough enough to pierce an armor plate without splintering, and yet be blown to pieces by the explosive it carries. A projectile is a cylindrical shell with a conical head, the joint of which is capped with soft steel which acts as a lubricant when the shell strikes, aiding its passage and preventing its cracking. Every advance in the manufacture of armor plate has been met with a similar advance in armor-piercing projectiles, making it seem that any plate which may be carried by a ship can be penetrated. A Kruppized plate, eight inches thick, resisted a projectile striking it with a velocity of 2,300 feet per second, but was pierced by a capped shell 2,500 feet velocity, and a Harveyized plate has been pierced to a depth of 14 inches by a 6-inch shell.



## ARMOR PLATES.

**ARMOR-PLATES:** thick slabs of iron to protect the sides of ships of war and the fronts of fortifications, a recent invention. In 1812 John Stevens, of N. J. designed, an iron-clad steam battery. In 1842 Mr. Balmano, of New York, proposed that war-ships should be clad with several thicknesses of  $\frac{3}{4}$ -inch iron plate, riveted one on another. Robert L. Stevens, of N. J., was commissioned by the U. S. govt. to build an iron-plated war-vessel driven by screws. In 1854 the French sent several floating-batteries to the Black Sea, clad with iron plates; and the English admiralty hastily imitated this example, producing eight very slow and unmanageable batteries, 1855-6. In 1860 the French sent to sea *La Gloire*, a timber-built ship of war, altered from a 90-gun three-decker to a 40-gun corvette, clad with  $4\frac{1}{2}$ -inch iron plates, having a burden of 3,000 tons. The Brit. govt. then began the creation of an armor-clad navy. Many problems had to be solved—whether to case old wooden ships with armor; to build and case new wooden ships; or to build new vessels, whose hull as well as armor should be of iron. Other problems were—how near the bulwarks should the armor-plates come, how near the bottom of the vessel, how near the stem and stern; also, what thickness of iron, and whether the same thickness in every part.

All the British armored men-of-war built between 1860-76 are 'iron-clads,' plated solely with iron; and in that period the thickness of the plates increased from  $4\frac{1}{2}$  inches to 14 inches, the weight increasing proportionately from 4-5 tons to 20-25 tons. The first 'steel-faced' plates used were on the turrets of the *Inflexible*, steel-plate of 9 inches thick forming the outside, iron-plate of 7 inches thick the back layer, a slab of strong teak being interposed 'sandwich fashion' between the two. Other British turret-ships have armor 12-18 in. thick.—In the Italian navy, the *Duilio* and *Dandolo* are armored with steel-plate of the thickness throughout of 22 inches, and the still more gigantic men-of-war, *Italia* and *Lepanto*, have a panoply of 3 ft. thickness throughout. The two largest French iron-clads, the *Devastation* and the *Foudroyant*, are plated to a thickness of 14 inches throughout. Germany's *Kaiser* and *Deutschland* have a 10-inch armor mail throughout.

Since 1860, experiments have been conducted by the British and other governments to determine the conditions of the utmost practicable resisting power in ship-armor and the utmost practicable destructive power in ship artillery, experiments causing a constant enlargement of cannon and constant thickening of armor-plate. The experiments in England have been conducted principally at Shoeburyness.

In early experiments on the *Warrior* target, Alderson's steel shell, Armstrong's conical shell, and Palliser's chilled-iron shell were fired at it from a 7-inch gun at 200 yards; the Palliser shot excelled the others, going clean through the target, armor and all, and bursting behind. On another occasion, a Palliser 115-lb. shot went through the target even at an angle of  $30^\circ$  from the perpendicular.

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The advantage contemplated in the 'sandwich fashion' of armor-plating adopted in the case of the *Inflexible* and other ships was, in addition to the increased defensive power implied in the increased thickness of plating, that broader and larger plates of practicable weight could by this means be produced, and that higher excellence of workmanship could be insured to thinner plates than to plates of 20 inches and upwards of thickness. The Italian admiralty tested on an unprecedented scale the relatively defensive properties of iron and steel armor, in 1876, and decided on the adoption of steel armor, the *Duilio* and *Dandolo* thus being the first steel-plated ships.

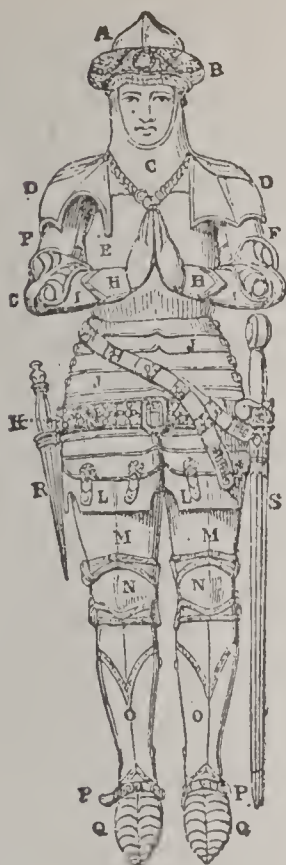
The next move in armor-plating was with a view to combining the superior resistance to perforation characterizing hard steel with the superior resistance to cracking possessed by tough rolled iron; and 'steel-faced' armor—with a front-plate of steel and a back-plate of rolled iron—attained precedence of iron in English war-ships. The hard steel plate in front resists perforation better than iron, breaking up the projectiles, or rendering them unavailing, while the steel and iron plate does not crack as would steel alone. For thicknesses up to 12 inches, a steel-faced plate, it is calculated, possesses as much resistance to perforation, in case of normal impact (or straight charge), as an iron-plate from 25 to 30 per cent. thicker and heavier; and in case of oblique impact, the superiority of the steel-faced over the iron plate is still greater, glancing projectiles at angles of obliquity at which mere iron would be 'bitten' into. Iron, though inferior to steel-faced plate for protection of the sides and batteries of ships, is found superior for plates 3 to 4 inches thick used for sheeting decks. A test at Spezia 1882, indicated that a larger number of bolts were needed for a given area of steel or steel-faced plate than had been previously supposed.

Armor clad forts are also attracting attention. Iron has been used largely in the defenses of Plymouth and Portsmouth, Eng. In 1864, a line of iron clad forts was built up at Shoeburyness, to test several modes of construction.

Regarded as articles of manufacture, armor-plates were at first produced mainly by hammering, several thicknesses of iron being welded one upon another, at a white-heat, by blows of a ponderous steam-hammer; but it is now more customary to produce them by rolling than by hammering—pressure being considered to produce more satisfactory results than percussion.

In the U. S. navy, armor plating had very small application till since 1883. The 'iron-clads' were mostly fourth-rate monitors with single turrets, though a few experiments with other styles of ships were made. Practically, compared with European nations, the United States had no armored vessels. Since the construction of the 'new navy' began, the United States has developed results in armor-plating surpassing those ever before achieved in the world. Until the U. S. navy dept. took up the question of armor development, but two kinds of plating were known—the all-steel product of Le Creuzot in France, and

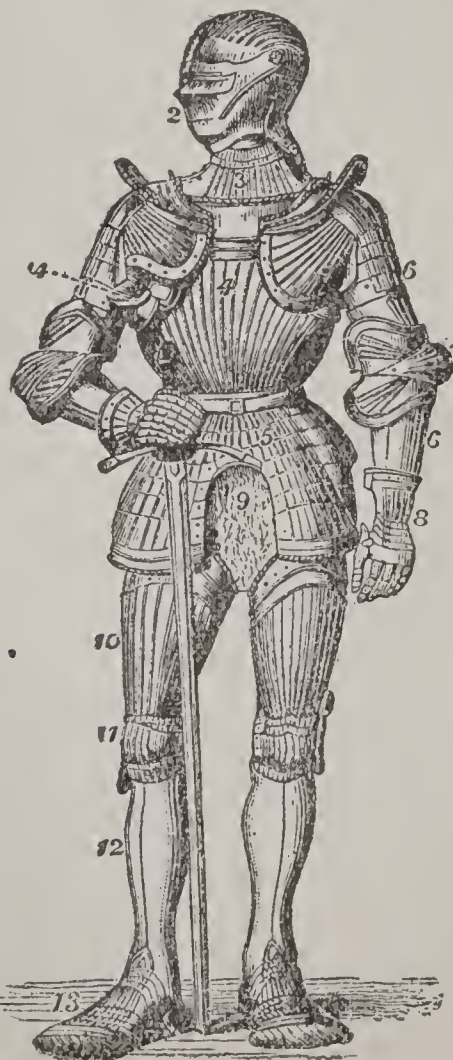




Armor, from the Effigy of Sir Richard Peyton, in Tong Church, Shropshire.—A, Bascinet; B, Jewelled orle round the bascinet; C, Gorget, or gorgiere of plate; D, Pauldrons; E, Breastplate-cuirass; F, Rere-braces; G, Coudes, or elbow-plates; H, Gauntlets; I, Vambrace; J, Skirt of taces; K, Military belt or cingulum, richly jewelled; L, Tuilles or tuillets; M, Cuisses; N, Genouilleres, or knee braces; O, Jambes; P, Spur-straps; Q, Sollerets; R, Misericorde, or dagger; S, Sword suspended by a transverse belt.



Arnatto (*Bixa orellana*).



Armor. — Fig. 1.—From Brass of Sir John de St. Quentin, 1397. Fig. 2.—Complete suit of Plate-armor, beginning of 16th century.—1, Helmet; 2, Visor; 3, Gorget; 3a, Camail; 4, Breastplate; 5, Skirt; 6, Arm-pieces; 7, Elbow-piece; 8, Gauntlet; 9, Hauberk; 10, Thigh-piece; 11, Knee-piece; 12, Greaves; 13, Sollerets; 14, Lance-rest; 15, Belt.

## ARMOR-PLATES.

the Eng. 'compound armor,' consisting of a steel face welded to a wrought-iron backing. The dept. began with experiments with an alloy of nickel instead of all-steel.

In a trial of armor-plates at Annapolis, Md., 1890, Sep., three types were tested—namely, one of solid steel with about 0.33 per cent. of carbon; one of nickel-steel—i.e., mild steel with 5 per cent. of nickel; and one of steel backed with iron—the Wilson patent. The plates were set side by side and were backed with 36 in. of oak. The gun used in the first series of trials was a 6-in. rifle, 17½ ft. long, set with its muzzle 30 ft. from the plates, and mounted on a carriage, so that it could be turned to point squarely against any part of the several plates. The projectiles were Holtzer chrome-steel shells, 17 in. long, 6 in. diameter, weight 100 lbs. The firing charge was 44½ lbs. of cocoa powder. The initial velocity was about 2,075 ft. per second. Each plate was 4 ft. high, 6 ft. wide, 10.5 in. thick; four shots were fired at each. The concluding test was a shot fired at each plate with an 8-in. rifle, firing an armor-piercing projectile which weighed 210 lbs. and was fired by a charge of 85 lbs. of powder, with an initial velocity of 1,800 ft. per second. The result proved the great superiority of the solid-steel armor over the compound iron and steel plate. As regards the relative efficiency of the solid-steel and the nickel-steel plate, the latter proved far superior to the others, as it was not cracked by the 8-in. shot in the centre, as was the all-steel plate; though the penetration of the all-steel plate was less than that of the nickel-steel. It had long been recognized that the theory upon which the English compound armor-plates were constructed was correct, although its application in practice had failed to produce the desired result. The object was to harden the surface of the plate, but the method adopted, of welding two different materials, resulted in an imperfect union, and rendered the plate liable to destruction by the cracking or stripping off of the hard face. To obviate this difficulty a process of tempering, known as the Harvey process (from its inventor, Hayward A. Harvey, of Orange, N. J.), which had been successfully adopted in the manufacture of tool steel, was applied to armor-plates at the instance of the dept., and among those tried at Indian Head 1891 were several which had been treated in the manner described. The results confirmed the opinion already formed as to the use of nickel steel, as indicated at Annapolis, and were also extremely favorable to the new method of treatment; but it was evident that the process needed perfecting. New trial-plates, therefore, were procured from two contractors, and their first test was at Indian Head, July 20. The first plate used was a 10½-inch plate of nickel-steel made by the Bethlehem Iron Co., the plate having been forged to 12½ inches and then 'Harveyed' and finally reformed to its former dimensions. The results of this trial were in some respects remarkable, yet a lack of uniformity was shown in the surface of the plate, found on investigation to be



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due to the process of re forging, resulting in a lower temperature and consequently increased softness of one side of the plate.

A second plate also had been prepared of nickel-steel, in all respects identical with the first, except that it had been forged to its final thickness before the Harvey process was applied. In the trial of this plate 1892, July 30, five Holtzer 8-inch shells, 250 lbs. each, with striking velocity of 1,700 foot-seconds, and each with an energy of 5,000 foot-tons, were fired at the plate at a distance of 30 yards, making the severest test to which an armor-plate had ever been subjected. The result was extraordinary. The five projectiles were broken up on the surface of the plate. The plate itself showed no signs of injury further than an opening of a slight temper crack four inches in length from one edge, and a bulge less than one inch in thickness at the back of the plate opposite each point of impact. The points of the projectiles were splashed, as it were, on the face of the plate, filling up the indentations made by the blows with their own material, which became welded to the substance of the plate itself, leaving it practically a smooth surface. The results of this trial demonstrated that the new American armor was superior to any other in the world, and that in comparison with it the plating of the great armored fleets of Europe offered but a slight capacity for resistance to projectiles. Other naval powers took immediate notice of the revolution brought about by our navy dept. in the manufacture of armor. A test plate was at once ordered by the Brit. admiralty, and another by the Russian ministry of marine. The trial of the English plate, with 6-inch instead of 8-inch guns, took place Nov. 17, at Portsmouth, with result identical with that in this country. Dec. 13 a trial of the nickel-harveyed plate, 10 in. thick, made for the Russian govt., was held at Ochta. After four 6-inch shots had been fired, without producing any greater impression than in previous trials, the authorities determined to try a heavier gun, with a view to determining what would destroy the plate. Accordingly a 9-inch gun of 35 calibres was used, and a projectile weighing 406 lbs. was fired at the plate with striking velocity of 1,655 foot-seconds. It penetrated and broke up, cracking the plate seriously in several places, but no part of the plate fell off the backing. A second shell of the same calibre was then fired with striking velocity of 1,889 foot-seconds. As a result of this unprecedented test, the plate was broken to pieces, and the whole target of plate and backing fell together to the ground face downward toward the gun. The woodwork and wrought iron backing fell forward with the plate. The shell with its point broken just pierced the wrought iron of the backing. It is considered that had it been a ship the inside of the vessel would have been quite uninjured. In 1895 there was invented at the Krupp works in Essen, Germany, a new process of hardening by using a hydrocarbon gas. This Kruppized steel has proven superior even to the Harveyized for armor plate.

## ARMOUR—ARMOUR INSTITUTE.

ARMOUR, *ár'mór*, PHILIP DANFORTH, capitalist: b. Stockbridge, N. Y., 1832, May 16; son of a farmer of Scotch descent. He studied at the Cazenovia seminary. In 1852, with two or three companions, he went to California, where he remained six years and accumulated a considerable fortune. For a time he resided in Milwaukee, and engaged in the grain business and pork-packing. He removed to Chicago 1875, the firm being Armour & Co., dealers in grain and provisions. His packing-house has been said to be the largest in the world. He was noted both for his gifts and for his personal work in philanthropy. D. 1901, Jan. 6. See ARMOUR INSTITUTE.

ARMOUR INSTITUTE: manual and technological training school, presented to the city of Chicago, Ill., by Philip D. Armour (q.v.) 1892, Dec.; designed to supplement the Armour Mission previously established, whose building cost \$250,000. The A. I. is supported by the income from the Armour Flats, a block of tenements erected by Mr. Armour and valued at \$1,000,000. The Institute building is of stone and marble and iron, is lighted by electricity and heated by steam, and is absolutely fire-proof. The purpose being to instruct in the arts and sciences, it is divided into depts. The first of these, chemistry and physics, contains a laboratory and lecture-room, where lectures are delivered on chemistry, physiology, and hygiene. Another dept. is for students in drawing, free-hand, mechanical, and architectural; and for students in commerce and business--the classes being open to both sexes. The whole of one floor is occupied for studios, used by students in drawing or designing book-covers, wall-paper, carpets, and decorations. Another floor is assigned to the domestic arts, cooking, dress-making, millinery, etc. The fifth floor is divided into a gymnasium 60 x 53 ft., and a technical museum. In the art dept., classes are taught embroidery and needle-work, and designing in stone, wood, and the metals. In the cooking dept. a complete kitchen and dining-room are directed by an accomplished *chef*. Besides the general co-education of the sexes, young women are taught the essentials to fit them for professional positions or for economical management of the household. The appliances for these purposes include a completely equipped laundry. There is instruction in practical nursing. Typewriting and stenography also are taught. A library and an equipment of chemical, physical, mechanical, and other apparatus complete the efficiency of this admirable institute, opened 1893.



## ARMOZEEN—ARMS.

**ARMOZEEN**, n., or **ARMOZINE**, n. *ár'mö-zên* [Fr. *ar-mosin*—corrupted from *Ormuz*, or *Hormuz*, an island in the Persian Gulf]: a thick plain silk, generally black, used for clerical robes.

**ARMS**: as weapons of offense—divided into two great classes—those that act by means of gunpowder, and those that do not. Of arms that act otherwise than by explosion, the greater part have been in use from the earliest times; they include the bow and arrow, sling, pike, spear, lance, dart, javelin, dagger, ax, mace, spiked or knotted club, scythe for chariots, dirk, bayonet, sword, cutlass, etc., together with such artillery as the ballista, catapulta, and battering-ram. Weapons depending on the use of gunpowder are of two kinds—those that can be held in the hand, and those that are too heavy to be portable. In the first class are found the names of the hand-cannon, hand-gun, arquebus, haquebut, demi-haque, matchlock, wheel-lock, firelock, currier, snaphaunce, caliver, escopette, petronel, dragon, hand-mortar, dag, tricker-lock, carbine, fustil, fowlingpiece, blunderbuss, pistol, musket or musquet, musketoon, rifle, etc. In the second class, more usually included under the name of artillery, are found the springel, war wolf, bombard, cart-of-war, culverin, demi-culverin, serpentine, falcon, saker, cannon, howitzer, petard, carronade, mortar, rifled cannon, war-rockets, etc. For the more important of these (of which nine-tenths are utterly obsolete) see the proper titles.

**ARMS**, **ARMO'RIAL BEARINGS**, or **ENSIGNS**: devices, which when painted on a shield form a coat of arms. These terms in popular speech include all the accompaniments of a shield—viz., the crest, helmet, and, where such exist, the supporters, etc. See these terms: also **HERALDRY**.

**ARMS**, **ASSUMPTIVE**: see **HERALDRY**.

**ARMS**, **BELLS OF**: tents mostly of a conical shape, for containing the small-arms for each company in a regiment of infantry. The tent is frequently painted with the color of the facings of the regimental uniforms.

**ARMS**, **COAT OF**: see **HERALDRY**

## ARMS—ARMSTRONG.

ARMS, MESSENGER AT: see MESSENGERS-AT-ARMS.

ARMS, SERGEANT AT: see SERGEANT-AT-ARMS.

ARMS, STAND OF: the complete set necessary for the equipment of one soldier, whether horse or foot.

ARMSTRONG, *árm'strǒng*, JOHN: 1709–1779, Sep. 7; b. Castletown, a pastoral parish in Roxburghshire, of which his father was minister. He studied medicine at the Univ. of Edinburgh, and soon afterwards commenced practice in London, and became known by the publication of several fugitive pieces and medical essays. In 1737, he published a very objectionable poem, *The Economy of Love*, which injured his reputation for a time. His principal work, *The Art of Preserving Health*, a didactic poem in blank verse, extending through four books, appeared in 1744. In 1760, he was appointed physician to the forces in Germany. Returning to London, he resumed practice, and died there. He was the author of several vols. in verse and in prose.

ARMSTRONG, JOHN: 1758–1843 (or 55); b. Carlisle, Penn.: American soldier and author. He served in the Revolutionary war, and at its close wrote the *Newburgh Letters*, taking up the cause of the officers who were suffering for their pay. These letters were published anonymously, and caused much excitement. Washington took the matter in hand, wisely averted the dangers of the movement, and did what he could to redress the wrongs of the soldiers. See Irving's *Life of Washington*. He was a brigadier-gen. in the war of 1812. He held several important civil offices, and was secretary of war, 1813–14. Being held responsible for the capture of Washington by the British, he resigned, 1814, Sept. He published several historical works relating to the wars in which he had served.

ARMSTRONG, JOHN: 1784, May 8—1829, Dec. 12; b. Ayres Quay near Bishop-Wearmouth: eminent physician and medical writer. He studied medicine at the Univ. of Edinburgh, commenced practice at Bishop-Wearmouth, and in 1818 he removed to London, where his practice became extensive, and he was elected physician to the fever hospital. His works on medical science were numerous, and of much value, especially regarding typhus fever, and febrile diseases generally. His lectures to his medical classes were published after his death, with the title, *Lectures on the Morbid Anatomy, Nature, and Treatment of Acute and Chronic Diseases, by the late John Armstrong, M.D.* Edited by Joseph Rix—one of his pupils. (London, 1834, 8vo.)

ARMSTRONG, SAMUEL CHAPMAN, LL.D.: military officer, and educator: 1839, Jan. 30—1893, May 11; b. Wailuka, Main, Hawaii; son of Richard A., D.D. (1805–60, b. Penn. of Scotch-Irish descent). Gen. A.'s mother was b. in Mass., of Puritan stock. His parents went 1831 as missionaries, of the Amer. Board, to the Sandwich Islands. He came to this country 1860, to complete his education, and graduated at Williams Coll., Mass., 1862.



## ARMSTRONG.

In that year, he organized a company of vols. and entered the Union army as capt. Three months' imprisonment followed his capture at Harper's Ferry. His gallantry at Gettysburg won his promotion as major 125th N. Y. Vols. He was promoted lieut.-col. 9th U. S. colored inf. 1863; col. 8th U. S. colored inf.; and brevetted brig.gen. vols. 1865. 1866, Mar., he was placed by Gen. O. O. Howard in charge of 10 counties in e. Va. with headquarters at Hampton, then a great contrband camp. In this district there was much irritation between the swarms of colored refugees and Gen. Lee's disbanded soldiers and the former residents; but order and peace were secured by the firm and kindly rule of Gen. A. At this time, according to his suggestion and plan, was established the Hampton Normal and Agricultural Institute (q.v.). Unexpectedly to himself Gen. A. was offered the chief direction of this work, to which he devoted his life with unflagging ardor and self sacrifice. Gen. A. has annually raised by his own efforts at the north \$60,000 to carry on this great work. In 1891, in Boston, while making a plea for Hampton he was stricken with paralysis, from which he never entirely recovered. He died at the scene of his labors.

ARMSTRONG, Lord (WILLIAM GEORGE ARMSTRONG), LL.D., D.C.L.: noted for his inventions, especially in artillery and in water-power machinery: b. 1810, Newcastle, where his father was a merchant. A. was articled to a solicitor in Newcastle and became his partner, but gave his leisure to his favorite pursuits in chemistry and mechanics, and his inventive faculty was constantly active. About 1838 he invented a much improved hydraulic engine; in 1845 a hydraulic crane; in 1842, an apparatus for producing electricity from steam, in reality from the friction sustained by the small quantity of water which accompanies the steam in its discharge. These and other inventions brought him into notice; he was elected a member of the Royal Soc. 1846; and shortly afterward, in conjunction with some friends, commenced the Elswick engine works, in the suburbs of his native town, an establishment on a large scale for producing mechanical constructions.

In 1854, while war was raging in the Crimea, the War-office was solicited by many inventors to make trial of new forms of cannon and projectiles. Mr. A., one of the number, was employed to make explosive apparatus for blowing up the ships sunk at Sebastopol. This led him soon afterwards to consider improvements in ordnance, and he devised a form of breech-loading cannon, combining many peculiarities in structure and action. He received encouragement to make a few field-pieces on his new method. He made lengthened experiments on the strength of iron and steel, on the relative merits of cast and wrought iron, on the best number of grooves in rifling, on the best pitch or twist for these grooves, on the most convenient modes of loading at the breech of the gun, on the mechanism for lessening the recoil, on the best form and structure of shot and shells, and on the fuses best suited for igniting the shells during their flight.

## ARMSTRONG.

Most of the early experiments were with guns throwing 6-lb. and 18-lb. shot and shells, and subsequently 32-lb. shells. The last-named gun was built up piecemeal, to avoid flaws or faults, and to insure strength, lightness, and durability. It was made in 3-ft. lengths. Bars of wrought-iron, 2 inches wide, were heated to whiteness, twisted spirally round a steel bar or core, and welded; other bars were twisted over these in a similar way, but with an opposite turn of the spiral; a third, and perhaps a fourth were added, according to the thickness and strength needed. Another heating to whiteness preceded a thorough welding of all the layers of bars by a steam hammer. The ends of two of these 3-ft. pieces were then nicely trimmed and adjusted, placed in contact, and bound together by the enormous pressure of a wrought-iron ring shrunk on while at a white heat. By varying the number and length of these sections, a gun of any length could be made. The core was then removed, and the bore of the gun rifled by exquisite machinery. The rifle-grooves were so small and close as to be upwards of 40 in number; their pitch or twist such as to make a complete circuit in a gun 10 ft. long. The breech of the gun was wholly distinct, and constructed in a different way; it could be drawn backward by unscrewing, and had a hole through its centre for introducing the shot or shell and the charge. At first the inventor adopted a steel interior for his gun; but afterwards relied on the toughest wrought-iron. The projectile employed with this gun might be solid shot, shell, case-shot, or canister-shot; but the shell was that to which most interest is attached. It was about three diameters in length; and thus a 32-lb. shot or shell could be fired from a gun of much smaller calibre than if it were spherical. The shell was built up of about 50 separate pieces of cast-iron, very accurately fitted, and enveloped in an iron sheath. Outside of it were two bands of lead, soft enough to be forced into the rifled grooves of the gun, and thus to acquire the rotatory movement by which the straightness of flight is so much insured.

The actual results obtained by a gun such as is above described were almost incredible. An ordinary long 32-pounder weighs 57 cwt.; Armstrong's 32-pounder weighs 26 cwt. The former requires 10 lb. of powder as a charge; for the latter 5 lb. will suffice. The former will send a shot or shell 3,000 yards; the range of the latter exceeds 9,000 yards. The fuses attached to the shells are so exquisitely adjusted that the shell can be made to burst either directly on leaving the gun, or half-way on its path, or when it strikes an object; in the last-named case, even a sack of shavings will afford the necessary concussion; and yet, so close is the structure, that an uncharged shell has been fired completely through 9 ft. of solid oak without the pieces separating. A.'s elaborate experiments were made chiefly with a 6-pounder,  $1\frac{3}{4}$ -inch calibre, and so light that two men could carry it (without its carriage); this small gun could reach 1,500 yards with wonderful ac-



## ARMSTRONG.

curacy of aim, and had a range of 3,000 yards at a certain elevation.

When A. had spent much of his time and thoughts during four years on this subject, the government, supported by the strongly expressed opinions of artillery officers of all ranks, proposed to secure the result of these experiments for the nation. A. offered to the government, without any stipulation, not only all his past inventions, but also all such as he might hereafter discover. This led to arrangements which the ministers in parliament characterized as liberal and patriotic on his part; and the terms thus suggested were accepted. An office was created for him, that of chief-engineer of rifled ordnance, for seven years provisionally; and a certain amount of salary was determined on, in consideration at once of his past inventions and of his future services. He was knighted by the queen in 1858.

The peculiar connection, partaking in some degree of the nature of a partnership, between the government and the Elswick firm, underwent changes from time to time, and was brought to a close in 1863. During its continuance, guns of gradually increasing power were made on A.'s system; 3, 5, and 12 pounders; then 18, 20, 32, and 40 pounders; then rapidly increasing in calibre, until at length a 600-pounder was produced, weighing upwards of 20 tons. The coil system of construction, the adoption of a large number of rifle grooves, and the use of the beautifully formed segment shell, were continued; but A. made variations in the combination of steel and iron, and adopted muzzle-loading for many of his larger guns. Elaborate experiments made by the War-office led to a conclusion that the A. breech-loader has many disadvantages for large ordnance. Notwithstanding its range, accuracy, power of working in a small space, easiness to clean, and safety to the gunners while loading, it is neither so cheap nor so simple as the muzzle-loader; it is difficult to handle, complicated, apt to get out of order, and not so useful for general purposes. The comparative cheapness has had much to do with the preference of the War-office for the Woolwich gun, a muzzle-loader. A. supplies, and has long supplied, many foreign governments with his guns, chiefly of large calibre. The manufacture is of the highest order, effected through the medium of machine tools of exquisite construction; but the practical utility of the gun, as compared with the Whitworth, Palliser, and other kinds, is still matter of controversy. See MACHINE GUN.

The great reputation and commercial success of A. depend on his skill as a constructor of water-power machinery. Early in his career, in 1847, when a plan was adopted for supplying Newcastle with water, he suggested that the power derived from the descent of the water through pipes from the reservoir should be utilized for working hydraulic cranes on the quay, and for various mechanical purposes in the town; this was done with marked success. The system has rapidly grown; until, at length, the A. hydraulic machinery is largely adopted in England and other countries

## ARMY—ARMY REGISTER.

for raising, lowering, hauling, and other purposes in connection with railways, canals, docks, piers, harbors, lock-gates, manufactories, warehouses, etc. The fabrication of the machinery employs a very large number of hands at Elswick, where the works are carried on by a joint-stock company. A. belongs to several scientific societies, and was in 1863 elected president of the British Assoc. He has been active in the inquiries concerning the operation of the patent laws. Cambridge and Oxford have conferred honorary degrees on A., and he is a member of several foreign knightly orders. He was knighted by the queen 1858; and created Baron A. 1883. D. 1900, Dec. 27.

**ARMY:** a body of men, organized and armed for war. The following are distinctions in the application of the name A. A *Covering A.* is encamped or in cantonments, for the protection of the different passes or roads which lead to the town or other place to be protected. A *Siege A.* is ranged around or in front of a fortified place, to capture it by a regular process of besieging. A *Blockading A.*, either independent of or auxiliary to a siege A., is intended to prevent all ingress and egress at the streets or gates of a besieged place. An *A. of Observation* takes up an advanced position, and by celerity of movement keeps a close watch on all the maneuvers of the enemy. An *A. of Reconnaissance* has a more special duty at a particular time and place, to ascertain the strength and position of the enemy's forces. A *Flying A.* comprises a strong body of horse and foot, moving quickly, to alarm the enemy, and to protect garrisons.

For historical notices or for descriptions of national military forces, see **ARMIES: BRITISH ARMY: UNITED STATES ARMY.** For the formation, organization, discipline, arms, equipment, duties, and tactics of armies, see the proper titles.

**ARMY ADMINISTRATION:** the whole of the operations connected with the raising, clothing, paying, maintaining, and controlling of an army. They are distinct matters from military command and discipline. The supreme command of the British army is assigned to the sovereign; but the secretary of state for war is her responsible representative in all that concerns administration—the commander-in-chief being her representative in matters relating to military command and discipline. The secretary is the organ through whom the wishes of the sovereign are reconciled with the wishes and intentions of parliament. Until the war with Russia in 1854, the administrative departments were much scattered; but now they are all consolidated under the secretary of state for war. See **WAR DEPARTMENT.** In the United States, the president is commander-in-chief of all the military forces of the nation; the secretary of war, appointed by the president, has the charge of military administration under the president's direction.

**ARMY REGISTER:** an annual publication under authority of the U. S. govt., giving the official list of the U. S. Army. It shows the regiments, companies, etc.; the



## ARMY SCHOOLS—ARNAULD.

officers; with the deaths and promotions during the year previous. A similar publication in Great Britain is called the Army List.

**ARMY SCHOOLS:** arrangement for instruction under govt. auspices, in connection with the U. S. army. They comprise two plans; one for education of enlisted men; the other for the children of enlisted, men for whom it is compulsory, and for those of officers, for whom it is optional. The schools for soldiers are termed post schools, and are conducted by officers of recognized ability, detailed for the purpose, and whose duty it is, to instruct enlisted men, and who are assisted by competent persons detailed from the rank and file, in the proportion of not more than 1 to every 15 men. Where a post has a chaplain he is also the instructor. Officers from the inspector-general's dept. inspect these schools at stated periods, and exercise authority in regard to the systems of education and methods employed. Children's schools are established at posts where the number of soldiers' children warrants it, and where no other means for instruction exist; and in such cases the children of private citizens living in the neighborhood of army posts are permitted, on payment of a small stipulated sum, to partake of the advantages.

**ARMY-WORM** (*Leucania unipuncta*): a gray caterpillar, striped with dark and yellow lines, allied to the cut-worm (q.v.), sometimes very destructive to cereal and forage crops. Though found at the s., it is more common in the n. and central states. The moth is brown, with white dot on the fore-wing. Its eggs are laid, from Apr. to June according to latitude, on grass plants, between the sheath and blade, and hatch in 7 to 10 days. The larva eats voraciously till it reaches its full size, nearly 2 in. in length, in about four weeks. It then forms a cell in the ground, changes to the pupa state, and in 14 to 21 days emerges as a moth. In the n. there are sometimes 2 broods, and at the s. 3 are common in a single season. Many of the moths, and a still larger number of the larvæ, live through the winter. In regions where it finds its home, this insect is usually present in grass-fields, but seldom attracts much attention. Occasionally there is a season in which its numbers are greatly increased, and it causes farmers immense loss. When compelled to migrate for food the caterpillars march in a solid body like an army, take a straight course, and consume every green thing in their path. In about 2 weeks from the beginning of their march they enter the ground to be transformed into moths. Their appearance cannot be confidently predicted, but is most likely after a mild winter preceded by a dry summer. Myriads of these insects are destroyed by contagious diseases; also birds and other insects are very destructive. Their vast numbers make it difficult to check their migrations; but the plowing of deep furrows with the steep sides away from the worms, placing boards on edge to form a fence, and poisoning with Paris green the grass or grain in their path, have been tried with varying success.

**ARNAULD**, *ârno'*, **ANGÉLIQUE**: 1624, Nov. 28—1684,

## ARNAULD.

Jan. 29; dau. of Robert Arnauld d'Andilly. From her earliest years, she showed extraordinary force and resoluteness of character. When not quite twenty years of age, she became a nun at Port-Royal des Champs, where she had been educated by her aunt, Marie Jacqueline Angélique Arnauld, sister of the great Arnauld. Nine years afterwards she was made sub-prioress; and, removing some years later to Port-Royal de Paris, she held the same office. During the persecution of the Port-Royalists, A. A., by her piety and courage, sustained the spirit of the sisterhood. The whole family, male and female, were determined Jansenists, and none more so than Mother Angélique de Saint-Jean (her conventual name), who met her many misfortunes with earnest intrepidity. A royal order was issued to break up the nunnery. The police arrested the inmates, who were dispersed in various convents throughout France, and constant efforts were made by the Jesuits to induce them to sign the 'Formulary of Alexander VII.' A. A. was alone exempted from listening to their arguments and solicitations, her 'obstinacy' being supposed invincible. At length, by command of the Abp. of Paris, the nuns were restored to Port-Royal des Champs; but for some years they were subjected to a strict surveillance by soldiers, who watched all their movements, and allowed them no intercourse with persons out of the convent. In 1669, however, was issued the edict of Clement IX. for the peace of the church, which was a kind of compromise on the vexed question of Jansenism and Jesuitism. The nuns received back the privileges of which they had been stripped, and constituted their society anew. A. A. was again elected prioress. In 1678, she was made abbess. After the death of her protectress, the Duchesse de Longueville, 1679, the persecution recommenced. At last Angélique sank under a complication of griefs, and died. She was learned without being pedantic, pious without bigotry, and gentle to others in proportion as she was severe to herself. A. A. wrote several works, the most valuable of which is *Mémoires pour servir à la Vie de Mère Marie Angélique Arnauld de Sainte Madeleine, Réformatrice de Port-Royal*.

ARNAULD, ANTOINE: 1560-1619, Dec. 29; b. Paris: the greatest advocate of his time in France. He was descended from an ancient family in Auvergne, which had distinguished itself in both civil and military affairs. A. was not less remarkable for his eloquence than for his probity. His zealous defense of the Univ. of Paris against the Jesuits in 1594 won for him a wide celebrity. It was reprinted in 1717. He published another work against the Society of Jesus and several tracts of an earnest political character. The Jesuits accused him of being a Huguenot, but the accusation was unfounded, for he had no personal predilection in favor of Protestantism as a distinct religious system. He had several children, who formed the nucleus of the Jansenists and Port-Royalists.



## ARNAULD

ARNAULD, ANTOINE, known as the great A.: 1612, Feb. 6—1694, Aug. 8; b. Paris: twentieth and youngest son of Antoine (1560–1619). Although originally intended for the bar, he disliked the legal profession, and entered the service of the church. At the Sorbonne, he became a pupil of Lescot, the confessor of Cardinal Richelieu, and afterwards bishop of Chartres. Lescot initiated him into the scholastic theology; but his attention and admiration were drawn to the writings of Augustine, who, he himself admitted, first showed him the difference between the two states—that of a nature whole and sound, and that of a nature corrupted by sin. In 1641, the Sorbonne wished to receive him into their society, on account of his extraordinary piety and talents, but Cardinal Richelieu opposed this. In the following year he was ordained a priest, and in 1643 he published a work entitled *De la Fréquente Communion*, which was received in the most favorable manner by all except the Jesuits who had taken alarm at the virtues of A., and were already attempting to defame one whom they instinctively felt to be a reproach to their order. As a consequence of this publication, he was now admitted ‘of the Society’ of the Sorbonne. A. not only replied to the aspersions of the Jesuits in his *Avertissement*, but also sent forth a work which was the prelude to a long and fierce contest with his adversaries, *Théologie Morale des Jésuites* (Moral Theology of the Jesuits). But the hatred of the latter was not confined to literary libels; they advised the chancellor of the Sorbonne to carry the dispute to Rome, whither A. would be obliged to follow and defend himself. In this scheme, however, they were defeated.

A. now buried himself in seclusion for twenty-one years, during which period his pen was almost continuously active. In 1644, appeared his *Tradition de l'Eglise sur la Pénitence* (Opinion of the Church on the Doctrine of Penitence). It was a reply to the attacks which the Jesuits had made against his *Frequent Communion*. A. was still entangled in the disputes which arose out of this treatise, when he became involved in another controversy that colored the whole of his subsequent career, and may be said to have won for him his position in history. This was the great Jansenist controversy. In 1640, had appeared a posthumous work of Jansenius, bishop of Ypres, entitled *Augustinus; seu Doctrina Sancti Augustini de Humanæ Naturæ Sanctitate, Ægritudine, Medicinâ, adversus Pelagianos et Massilienses*. It laid down with a rigor equal to that of Calvin the doctrines of predestination, the corruption of human nature, and the depravity of the will. It was specially intended as a counteractive against the lax principles and loose morality of the Jesuits, many of whom, and especially their great champion, Molina, entertained extreme Pelagian views of the freedom of the human will, which they had cunningly interwoven into their ‘scarlet-colored’ web of ethics. The work, in the meantime, was condemned by Pope Urban VIII., 1641, Aug. 1. A., who quickly apprehended its vital importance in the existing

## ARNAULD.

state of things, boldly ventured to defend it against the censures of the papal bull. He published several pamphlets, closing with a first and second *Apologie de Jansénius*. It is to the honor of the religion of A., however, that it was not always controversial. Whenever a moment of armistice was permitted him, he occupied it in writing such works as *Mœurs de l'Eglise Catholique*, *La Correction*, *La Grâce*, *La Vérité de la Religion*, *De la Foi*, *de l'Espérance*, *et de la Charité*, and the *Manuel de Saint Augustine*. He also varied these occupations by translating into Latin his *Frequent Communion*, and by the composition of his *Novæ Objectiones contra Renat. Descartis Meditationes*, and several smaller tractates. In addition to his literary labors, he undertook the direction of the nuns of Port-Royal des Champs, a convent of which his sister, Marie Jacqueline Angélique Arnauld, was abbess. In this retreat he was surrounded by many friends, thirsting like himself for the quiet pleasures of study, some of whom have left their mark in the world, such as Pascal, Nicole, etc. Here they wrote in common numerous excellent works. A. executed parts of the *Grammaire Générale Raisonnée de Géométrie*, and *L'Art de Penser*. In 1649, the Jansenist controversy broke out more fiercely than ever. The *Augustinus* of the Bishop of Ypres was again attacked and condemned by the Sorbonne and the pope. A. replied in his *Considérations*. In 1650, appeared what he conceived to be his best work, *L'Apologie pour les Saints Pères*. For the next half-dozen years he was engaged in constant and painful disputes yet, in spite of the polemical character of his life, the impression of his piety and earnestness was deepened in the mind of the nation; and on reading some of his compositions, even Alexander VII. is reported to have praised the author, and to have exhorted him for the future to despise the libels of his adversaries. During the strife he published *La Concorde des Evang'les* and *L'Office du Saint-Sacrement*. In 1655-56, for prudential reasons, he left his retreat at Port-Royal; about the same time he was expelled from the Sorbonne and the faculty of theology.

In 1656, the war with the Jesuits was renewed—not, however, by A. in person. An unknown knight with closed visor had ridden into the lists—the great Pascal. Under the *nom de plume* of Louis de Montalto, he discharged his scorpion wit against the Jesuits for about a year and a half in the *Provincial Letters*. A. furnished him with materials; but, in 1658, he took the field *in propria personâ* by publishing his *Cinq Écrits en faveur des Curés de Paris contre les Casuistes relâchés*. In 1662, appeared *La Nouvelle Hérésie* (of the Jesuits); in 1669, the first vol. of his *Morale Pratique* (of the Jesuits), the last of which was not published until the year of his death.

A., who was a sincere Catholic after his fashion, next had a theological controversy, properly so-called, with the reformed minister Claude, the consequence of which was his vol., *Du Renversement de la Morale de J. C. par la Doctrine des Calvinistes touchant la Justification* (1672). In 1675, he returned to the subject in his *Impiété de la Morale des*



## ARNAULD—ARNDT.

*Calvinistes.* Some years previous to this, A. had enjoyed the peace of Clement IX., which put a stop for the time to the Jansenist controversy. He had been presented to the papal nuncio and to the *Grand Monarque*, both of whom flattered him highly; but the Jesuits, who could not breathe freely in his presence, used their utmost efforts to prejudice Louis against him, and at last the king issued an order for his arrest. A. hid himself for some time, but finally withdrew into Belgium. He felt his exile keenly, though honored by many persons of learning and dignity; and could not rest in one city, but wandered from place to place, ever showing the same astonishing vigor of mind and the same polemical tendency. It is strange that this man, who was celebrated among his friends for equanimity and gentleness of heart, should have been so bitter in his controversies, even with his friends, for he wrote not against his enemies only, but against Pascal, Domat, Nicole, his protector, Pope Innocent XI., and his old friend, Père Malebranche. So earnest was he for the truth—which earnestness had no doubt been greatly intensified by persecution and controversy—that he could never thoroughly recognize that there might be truth on the other side also. He died at Brussels. His works, which amount to upwards of 100 vols., were pub. Paris, 1775–83.

ARNAULD, ROBERT D'ANDILLY: 1588–1674, Sept. 27; eldest son of Antoine Arnauld, the advocate; brother of the great Arnauld. He was a person of considerable consequence at the French court, where his influence was ever exerted beneficially. Balzac spoke very highly of him. At the age of fifty five, he quitted the bustle of the world for the solitude of Port-Royal des Champs, where he devoted himself to religious history and biography. His chief works are translations, such as those of the *Confessions of St. Augustine* and of the *History of the Jews*, by Josephus. The latter work is esteemed more elegant than accurate, however. In 1668, appeared his translation of the *Lives of the Holy Fathers of the Desert, and of several Saints*; and in 1670, that of the works of St. Theresa. He was likewise the author of some pieces of religious verse.

ARNAUTS, n. plu. *âr'nawts*, a native name for the Albanian mountaineers, and meaning 'brave men.'

ARND, or ARNDT, *ârnt*, JOHANN: 1555–1621; b. at Ballenstadt, Anhalt; was Lutheran pastor at Quedlinburg, Brunswick, and elsewhere, and died at Celle, Hanover. He was remarkable for his piety and active benevolence; but he is known chiefly for a work entitled *True Christianity (Wahres Christenthum)*, which was translated into most European languages, and is yet popular in Germany. Its object is 'edification'—the promotion of practical religion; and it is written with great warmth and unction, and in a strain of piety bordering on mysticism. It has been called the Protestant à Kempis, and its author the Fenelon of the Protestant Church. There is an English translation by W. Jaques (Lond. 1815, 2 vols.).

ARNDT. ERNST MORITZ: 1769–1860, Jan. 29; b. in the

island of Rügen: prof. in the Univ. of Bonn, and for half a century one of the leading political writers of Germany. After travelling over great part of Europe, he became, in 1806, prof. of history in Greifswald. Here, among other writings, he published his *History of Serfdom in Pomerania*, for which he was formally denounced and accused by several nobles. In his *Spirit of the Times* (Altenb. 1807), he attacked Napoleon with such boldness that, after the battle of Jena, he had to take refuge in Stockholm. Returning under a feigned name, he resumed his functions at Greifswald in 1810; but war becoming imminent, he resigned the following year, and became an active co-operator with the minister, Von Stein, and other patriots, in throwing off the foreign yoke. His numerous fugitive writings, full of energy and fire, contributed not a little to rouse and sustain the spirit of Germany for the war of liberation. His best poems belong to this period, and several of them have become national songs. (A new selection, Leip. 1850.) His song, *What is the German's Fatherland?* is sung wherever German is spoken. In 1818, he was made prof. of modern history in the new Univ. of Bonn, but became involved in 1819 in the prosecutions for what were called 'demagogic movements,' and was suspended. Though acquitted on trial, he was made to retire, retaining his salary. After twenty years' suspension, he was restored in 1840. His writings are numerous: we may mention his *Beschreibung und Geschichte der Schottländ, Inseln*, etc. (Leip. 1826): a collection of his fugitive *Schriften für und an meine lieben Deutschen* (3 vols. Leip. 1845); and *Erinnerungen aus dem äussern Leben* (3d ed. Leip. 1842). He was elected a member of the German national assembly in 1848, but seceded from it with the whole Gager (q.v.) party in 1849. He powerfully supported the party who advocated a constitutional hereditary monarchy, and took a prominent part in the appointment of the archduke John as regent, and in the fruitless deputation to Berlin to offer the empire to the king of Prussia. After the dissolution of the Frankfort assembly, A. did not cease in his fugitive writings to advocate the views of the German national party.

ARNE, *árn*, THOMAS AUGUSTINE, Mus. Doc.: 1710-78; b. London: one of the best and most genial of English composers. He received his early education at Eton. His father, who was an upholsterer, intended to educate him for the bar; but the love of music was too strong to be restrained. Young A. became skilful as a violin-player, forming his style chiefly on the model of Corelli; and his zeal in the study of music induced his sister (afterwards celebrated as Mrs. Cibber) to cultivate her excellent voice. He wrote for her a part in his first opera, *Rosamond*, which was first performed with great success in 1733. Next followed his comic operetta, *Tom Thumb, or the Opera of Operas*; and afterwards his *Comus* (1738), showing greater cultivation of style. He married a singer, Cecilia Young (1840); and after a successful visit to Ireland, was engaged as composer to Drury Lane Theatre, and wrote many vocal pieces for the Vauxhall concerts. The national air,



## ARNEB—ARNEE.

*Rule Britannia*, which was originally given in a popular performance, *The Masque of Alfred*, was his composition. He composed also two oratorios, the opera *Eliza*, and another, *Artaxerxes*, in the Italian style; but his genius was better adapted to simple pastoral melody than to great dramatic compositions. He died in London.

ARNEB, n. *ár'něb*: fixed star of  $3\frac{1}{2}$  magnitude, called also  $\alpha$  Leporis.

ARNEE, n. *ăr-ně'*, or ARNA [native name]: the largest animal of the ox kind yet known. It is a native of India,



Skull and Horns of Arnee.

and is found chiefly in the forests at the base of the Himalayas and in the n. e. provinces, never descending to the low plains. It is simply the wild buffalo, and differs from the tame variety in being larger and fiercer. Alone of Indian wild animals, it will charge unprovoked. The



Arnee.

(From an Indian picture.)

A. is technically termed *Bubalus Arni*. The color is slaty black; the hide very thick, with scanty hairs. A pair of horns in the British Museum measure more than six feet each along the outer curve. When the head of an A. is placed with the muzzle on the ground, it requires the outstretched arms of a man to hold the points of the horns.

## ARNHEIM—ARNICA.

From the manner in which the A. is introduced in Indian paintings, it seems to have been sometimes tamed.

**ARNHEIM**, *âr'n'hîm*, or **ARNHEM**, the Roman *Arenacum*: cap. of the prov. of Guelderland, Holland; on the right bank of the Rhine, which is here crossed by a bridge of boats; has a considerable transit-trade between Amsterdam and Germany. The environs of this strongly fortified town are exceedingly picturesque. Among its most remarkable buildings are the Reformed Dutch Church, which contains monuments of the dukes of Guelderland; and the town-house, noted for the grotesque adornment of its front, which has gained it the name of Duivelshuis. There are several paper-mills in the neighborhood. Here Sir Philip Sidney died in 1586, after the battle of Zutphen. In 1813, A. was taken by storm by the Prussians, under General Bulow, and the way thus prepared for the occupation of Holland. Pop. (1891) 50,194; (1901), 58,168.

**ARNHEM LAND**, *âr'n'hēm*:- name formerly applied to a region in North Australia; so called from the ship of the Dutch navigators who discovered it, 1618.

**ARNICA**, n. *âr'nî-kă* [Gr. *arnîon*, a little lamb—from *arna*, a lamb—from the resemblance of the leaf to the soft coat of a lamb]: genus of plants belonging to the natural order *Compositæ*, the tribe *Senecionideæ*. The flowers of the ray are female and ligulate, those of the disk hermaphrodite and tubular. The receptacle is naked; the pappus hairy. The root, leaves, and flowers of the Mountain A. (*A. montana*), sometimes called Mountain Tobacco, and Leopard's Bane, are much valued in medicine, and administered in various forms as a stimulant in paralytic affections, typhoid fevers, and other diseases. They are also applied with much benefit to bruises, to promote the re-absorption of extravasated blood. They contain a peculiar volatile oil, a resin, an extractive matter, and an alkaloid (*Arnica*). The root is perennial and crooked, the stem about two ft. high, simple or little branched, with few leaves, bearing on the summit a head of flowers of a dark golden yellow, often two inches in breadth. It flowers from June to August, forms an ornament of mountain meadows in Germany and Switzerland, and is



*Arnica montana.*



## ARNICINE—ARNO.

found as far s. as Portugal, and as far n. as Lapland. *A. mollis*, n., and *A. nudicaulis*, s., are N. American.

**ARNICINE**, n. *âr'nĩ-sên* [see **ARNICA**]: a bitter principle contained in the flowers of the *Arnica montana*.

**ARNIM**, *âr'nĩm*, **ELIZABETH VON**, better known as Bettina, wife of Ludwig Achim von Arnim (q. v.): 1785–1859; b. at Frankfort-on-the-Maine. From her childhood excitable and eccentric, an early and profound impression was made upon her mind by the suicide of her friend, the Canoness von Gunderode. The next great event of her life was her devoted attachment to and intimacy with Goethe, at that time a man of nearly sixty. Their correspondence, entitled *Goethe's Letters to a Child*, was published in 1835, and translated by Bettina into English. Her letters are poetical, graceful, and fascinating, though often careless and extravagant, and abound in graphic sketches of men of the time. Goethe turned many of these letters into verse. Bettina's later works were semi-political in their character, and, like her earlier, full of fantastic beauty.

**ARNIM**, **KARL OTTO LUDWIG VON**: 1779–1861; b. Berlin: well-known writer of travels and other works. After studying at Halle and Göttingen, he travelled at different times over the most of Europe, and was employed on the embassies at Stockholm and London. His *Flüchtige Bemerkungen eines flüchtigen Reisenden* (Passing Remarks by a Passing Traveller, 6 vols., Berl. 1837–50), is recommended for its clear, elegant style, as contrasted with the lumbering and involved writing of the 'Academic' school. A. also wrote in English *Napoleon's Conduct towards Prussia* (Lond. 1814), and published *German National Melodies*, with German and English text (Lond. 1816). He was the author of a play and several poems.

**ARNIM**, **LUDWIG ACHIM VON**: 1781, Jan. 26—1831, Jan. 21; b. Berlin: fantastic but original German writer of romances. After studying the physical sciences, he began his career as an imaginative author with *Ariel's Revelations*, a romance which, though based on the principles of the new poetic school which had then risen in Germany, indicated, nevertheless, that the author could strike out a way of his own. His travels through Germany afforded him an opportunity of catching the peculiarities of popular life in its various provincial manifestations. He was especially interested in the old popular poetry, and stirred up among his countrymen a warmer sympathy for it by the publication, with Clemens Brentano, of *The Boy's Wonderhorn* (Heidelberg, 1806–08). In 1809, appeared the *Winter Garden*, a collection of novels; in 1810, the romance entitled *The Poverty, Riches, Guilt, and Repentance of the Countess Dolores*; in 1811, *Halle and Jerusalem, the Sports of a Student, and the Adventures of a Pilgrim*, in which last his humor took a very saucy turn. In 1817, he published the *Crown Guardians*, a work characterized by its originality, richness of fancy, and vivid portraiture. The later years of his life were spent partly in Berlin and partly at his estate near Dahme, where he died.

**AR'NO**: next to the Tiber the most considerable river of

## ARNOLD.

central Italy; rises on Mount Falterona, an offset of the Apennines, 4,444 ft. above the sea, 25 m. n. of Arezzo. It flows s.e. through the deep and fertile valley of Casentino; enters the richly cultivated plain of Arezzo, where it receives the waters of the Chiana; then flows n.w. and n. through the upper valley of the A. (*Valdarno*), one of the most delicious parts of Tuscany; afterward it receives the Sieve, its largest tributary, and turns its course toward the w., flowing past Florence, Empoli, and through the town of Pisa. Total length about 140 m. In old times, the embouchure of the A. was at Pisa; now it is about four or five m. distant, lat.  $43^{\circ} 41'$  n., long.  $10^{\circ} 15'$  e. The A. is navigable for barges as far up as Florence, but in the summer this frequently becomes impossible. The Italian poets speak of 'the golden A.,' but, in truth, its waters have mostly the unpleasant color of milk and coffee mixed. The A. is noted for rapid and destructive inundations. The most memorable are those of 1537, Sep., when the whole of the Valdarno was laid under water, which rose to the height of 8 ft. in parts of Florence; and that of 1740, caused by the long continuance of the sirocco, which completely melted the snows on the Apennines.

ARNOLD, *âr'nûld*, or ARNALDO, *âr-nâl'do*, OF BRESCIA: born Brescia; d. 1155: reformer, who attacked the corruption of the clergy of his day. He was educated in France under Abelard, and adopted the monastic life. By his preaching, the people of his native place were exasperated against their bishop, and the fermentation and insurrectionary spirit spread over a great part of the country, when he was cited before the second Lateran Council, and banished from Italy. He retired to France, but experienced the bitter hostility of St. Bernard, who denounced him as a violent enemy to the church. He thereupon took refuge in Zurich, where he lived several years. Meanwhile his doctrines exerted powerful influence in Rome, which ended in a general insurrection against the govt., whereupon A. repaired thither, and endeavored to lead and direct the movement. He exhorted the people to organize a govt. similar to the ancient Roman republic, with its consuls, tribunes, and equestrian order. But they, provoked by the treachery and opposition of the papal party, and disunited among themselves, gave way to the grossest excesses. The city was for ten years in great disorder. Lucius II. was killed by the populace in an insurrection 1145; and Eugenius III., to escape a similar fate, fled into France. These violent struggles were subdued by Pope Hadrian IV., who, feeling the weakness of his temporal authority, turned to the spiritual, and resorted to the extreme measure of laying the city under excommunication; when A., whose party became discouraged, and fell to pieces, took refuge with friends in Campania. On the arrival of the emperor, Frederick I., for his coronation 1155, A. was arrested, brought to Rome, tried, hanged, his body burned, and the ashes thrown into the Tiber.—His followers were called Arnoldists.



ARNOLD, BENEDICT: 1740-1801; b. Norwich, Conn., of respectable parentage. He was educated at the common school, being intended for a mercantile life. He was twice apprenticed to druggists, and each time ran away to enlist in the army, only to desert at the risk of his life. He finally began the drug business on his own account in New Haven, but failed under suspicious circumstances. He seems to have been fascinated with the surroundings of military life, and, being plausible, obtained the captaincy of a local militia regiment. When the revolution broke out, A. entered the service of his country, and was appointed colonel. He gained distinction by vigorous action on Lake Champlain, but his dishonesty soon involved him in difficulty with the Massachusetts committee of safety, and he resigned in anger. He returned to the service, however, and was appointed, with Gen. Montgomery, to the command of an expedition against Quebec, which failed, and in which Montgomery was killed and A. severely wounded. He was invalided at Montreal, where some disgraceful transactions added to the heavy cloud on his reputation. He somewhat redeemed himself. 1776, Oct., when, on Lake Champlain, he fought a brilliant naval engagement with a much larger force of the enemy, in which his daring gave him the name of a hero among his countrymen. Soon after this, the action of congress, in naming five major-generals from among officers his juniors in rank and his inferiors in ability, roused an implacable resentment which opened his way to treason. When the English evacuated Philadelphia, A. was sent there in command. Here he lived extravagantly, ran into debt, and was accused of the meanest speculation, and was tried by court-martial and sentenced to be reprimanded by the commander-in-chief. This painful duty was performed by Washington as gently as possible, but A. was more embittered than before. Washington, who still had confidence in him, at his solicitation placed him in command of the important post of West Point. A. entered at once into negotiations with Sir Henry Clinton for the surrender of this charge to the British, for a stipulated reward of a brigadier-general's commission in the British army and the promise of £30,000. The accidental arrest of Major André (q.v.), the agent of Clinton in effecting the negotiations, and the discovery of his papers, resulted in the exposure of A.'s treachery, and the securing of West Point from danger. André was hung as a spy. Arnold escaped, 1780, Sep., on board the sloop-of-war *Vulture*, entered the British service, received £6,000 and a commission, and afterward engaged in some depredations on the James river. Later, he was sent to attack New London, Conn. At the close of the war he retired to England, and afterward did some business in New Brunswick and Guadeloupe; but his latter days were passed obscurely in London, where he died, followed by the contempt even of those in whose interest he had sought to betray his country. A. married, 1779, Miss Shippen, of Philadelphia, who died 1796; he had several children.

AR'NOLD, Sir EDWIN: author: b. Rochester, England, 1832, June 10. He graduated at Oxford Univ. 1854; was appointed principal of the govt. Sanskrit College at Poona, India, and fellow of the Univ. of Bombay; resigned 1861 and became editorially connected with the London *Daily Telegraph*, with which he still (1890) remains; received the Turkish order of the Medjidie 1876; and became a companion of the Star of India 1877. Besides editorials, criticisms, and reviews, he has published *Belshazzar's Feast*, prize poem (1853); *Poems, Narrative and Lyrical*; *Griselda, a Drama*; *Education in India*; *The Euterpe of Herodotus*; *The Book of Good Counsels*; *The Poets of Greece*; *Hero and Leander* (1874); *The Indian Song of Songs* (1875); *The Light of Asia* (1879); *Indian Poetry* (1881); *Pearls of the Faith* (1883); *The Song Celestial* (1885); *Lotus and Jewel* (1888) and *The Light of the World* (finished 1890). He visited the United States in the autumn 1889 and 1891-2.

AR'NOLD, JONATHAN: patriot: 1741, Dec. 14—1798, Feb. 2; b. Providence, R. I. He was a member of the colonial assembly of R. I. 1776, entered the revolutionary army as a surgeon, and afterward had charge of a hospital. He removed to St. Johnsbury, Vt., served one term in the continental congress, and was judge of the Orange co. (Vt.) court 16 years.

AR'NOLD, MATTHEW: English literary critic and poet: 1822, Dec. 24—1888, Apr. 15; eldest son of Dr. Thomas A. of Rugby; educated at Winchester and Rugby. He greatly distinguished himself at Oxford, where, 1845, he was elected a fellow of Oriel College. In 1851 he was appointed an inspector of schools; and in 1857 prof. of poetry at Oxford, which position he resigned 1867. In 1859, and again 1865, he was sent by the govt. in connection with the commission appointed to inquire into the state of education in France, Germany, and Holland. In 1883 a pension of £250 was conferred on him, and in the same year he lectured in the United States, where he was received with great respect, though with no great enthusiasm. His lecture on 'Emerson,' refusing him the high rank as poet and philosopher usually assigned him, provoked much hostile criticism. A. held the honorary degrees of Edinburgh and Oxford, and an Italian order.

A. was known first as a poet of classic taste and exquisite purity of imagination, but his writings in later years were almost exclusively in prose. His chief productions in verse are *Poems* (1853), containing, among other fine pieces, *Sohrab and Rustum*, *Tristram and Yseult*, *Balder*, and *Merope* (1858), an attempt to naturalize in English literature the form of the Greek drama; and *New Poems* (1867). His prose writings are numerous. Among the chief are lectures on *Translating Homer* (1861); *Report on Education in France, Germany, and Holland* (1861); *A French Eton, or Middle-class Education and the State* (1864); *Essays on Criticism* (1865); *Lectures on the Study of Celtic Literature* (1867); *Schools and Universities of the Continent* (1868), *Culture and Anarchy, an Essay in Political and Social*



*Criticism* (1869); and *Higher Schools and Universities in Germany* (1874). In *St. Paul and Protestantism* (1870), and still more in *Literature and Dogma* (1872), he startled the public by his piercing and audacious application of literary criticism to religion. In 1875 he published *God and the Bible*; in 1877, *Last Essays on Church and Religion*; in 1879, *Mixed Essays*; and in 1882, *Irish Essays, and Others*. He delivered interesting public addresses.

AR'NOLD, RICHARD: 1828, Apr. 12—1882, Nov. 8; b. Providence, R. I. He graduated from West Point 1850, was connected with the exploration of the route of the Northern Pacific railroad, rendered distinguished services in the civil war, and rose to the rank of brevet maj. gen. U. S. A., and was afterward in command of various forts. He died at Governor's Island, N. Y.

AR'NOLD, THOMAS, D.D.: head-master of Rugby School, England: 1795, June 13—1842, June 12; b. West Cowes, in the Isle of Wight. In 1807 he was sent to the public school of Winchester, where he remained till 1811, when he was elected a scholar of Corpus Christi College, Oxford. In 1815 he was elected fellow of Oriel College, and he gained the chancellor's prize for the two university essays, Latin and English, 1815, 17. As a boy, he is said to have been shy and retired; as a youth, disputatious, and somewhat bold and unsettled in his opinions; but before he left Oriel, he had won the good opinion of a college which at that time boasted such names as Copleston, Davison, Whately, Keble, Hawkins, and Hampden. He took deacon's orders 1818, and the year afterward settled at Laleham, near Staines, where he occupied himself in preparing pupils for the university. In 1820 he married Mary, sister of one of his earliest school and college friends, and youngest daughter of the Rev. John Penrose, rector of Fledborough, Nottinghamshire. About ten years were spent in this quiet and comparatively obscure life; he was preparing himself for the arduous post that he afterward occupied; he was maturing his opinions, and he had also already commenced his great literary undertaking, the *History of Rome*. It was a period which he himself was accustomed to look back upon with some regret. His letters at this epoch reveal a fine ambitious spirit bending cheerfully to the task of tuition, more useful than glorious; they show also that those religious and political views which afterward distinguished him were being matured in the privacy of Laleham. 'I have long had in my mind,' he thus writes to a Mr. Blackstone, 'a work on Christian politics, or the application of the Gospel to the state of man as a citizen, in which the whole question of a religious establishment, and the education proper for Christian members of a Christian commonwealth, would naturally find a place. It would embrace also an historical sketch of the pretended conversion of the kingdoms of the world to the kingdom of Christ in the 4th and 5th c., which I look upon as one of the greatest *tour d'adresse* that Satan ever played. . . . I mean that by inducing kings and nations to conform nominally to

## ARNOLD.

Christianity, and thus to get into their hands the direction of Christian society, he has in a great measure succeeded in keeping out the peculiar principles of that society from any extended sphere of operation, and insuring the ascendancy of his own.' At Laleham A. became acquainted with Niebuhr's *History of Rome*. This was an era in his life. It produced a revolution in his historical views, and his own *History of Rome* became modelled almost too faithfully on that of the great German.

From Laleham he was called to the arduous duties of the head-mastership of Rugby School. On these he entered 1828, Aug.; and here he carried nearly to perfection his system of public education. He produced and maintained among the boys a high tone, moral and religious. He had the tact to make himself both loved and feared. He guided with great dexterity the *public opinion of the school*. 'In the higher forms,' says his biographer, 'any attempt at further proof of an assertion was immediately checked. "If you say so, that is quite enough; of course I believe your word;" and there grew up in consequence a general feeling that it was a shame to tell A. a lie—he always believes one.' On one occasion, when he had been compelled to send away several boys, he said: 'It is *not* necessary that this should be a school of 300, or 100, or of 50 boys, but it *is* necessary that it should be a school of Christian gentlemen.' But the school was far from occupying the whole energies of A. The *History of Rome* went on; he took part in all the great questions of the day, political and theological. In politics he was a whig, without being fettered by the ties of party. In the theological discussions of the day he was distinguished chiefly by his broad views of the nature of a Christian church. It was his leading idea that a *Christian people* and a *Christian church* ought to be synonymous expressions. He would never tolerate that use of the word church which limited it to the clergy, or which implied in the clergy any peculiar sacredness, or any traces of mediatorial function. The *priest* was unknown to him in the Christian community; this placed him at once in antagonism to the High Church party; and even clergymen of the Low Church complained that he did not set sufficient value on their sacred order. But all men, of whatever party, admitted and admired the zeal with which he taught that the full spirit of Christianity should permeate the whole civil or political life. If he seemed to lower the altitude of the clergy, it was only because he would raise the general level of the laity. As an Englishman, he was convinced that 'the founders of our present constitution in church and state did truly consider them to be identical, the Christian nation of England to be the church of England; the head of that nation to be, for that very reason, the head of the church.' It may be doubted whether this is quite historically correct; but it certainly presents a noble theory to the imagination.

In domestic life, Dr. A. was most happy; here he was distinguished by unfailing cheerfulness and amiability. In 1832 he purchased Fox How, a small estate between Rydal



## ARNOLD—ARNOTT.

and Ambleside, and in this charming retreat he enjoyed in the vacations, among the family circle, his own uninterrupted studies. Fox How has become a classical spot to tourists. For a brief time he held a place in the senate of the London Univ.; he resigned the seat on finding that he could not introduce some measures which he had at heart. In 1842 he received from Lord Melbourne the offer of the Regius professorship of modern history at Oxford. This appointment he accepted with peculiar gratification. He delivered some introductory lectures, which were heard with enthusiastic interest; and it was his intention, on his retirement from Rugby, to enter with zeal on the duties of his professorship. But this and all other literary enterprises were cut short by a sudden and painful death. The last vacation was at hand, the journey to Fox How was to be taken in a few days, when he was seized with a fatal attack of spasm of the heart. Few biographies end more abruptly or more mournfully; but the sufferer met his death with perfect fortitude and in the full Christian hope.—His principal works are *five vols. of sermons*; the *History of Rome* (3 vols.), broken off by his death at the end of the second Punic war; and an *edition of Thucydides*. See *Life and Correspondence of A.* by the Rev. A. P. Stanley, afterward Dean of Westminster (1845; 12th ed., with additions, 1881).

ARNOLD, THOMAS KERCHEVER: 1800–1853, March 9; b. Stamford, England: clergyman and author of educational works. He graduated at Oxford 1821; was appointed rector of Lyndon, Rutlandshire, 1830, and there continued till his death. He published his *Greek Prose Composition* 1849, and his *Latin Prose Composition* 1850; both works had an instant great success. He compiled, with J. E. Riddle, an *Eng.-Lat. Lexicon*, pub. 1847.

ARNOTT, or ARNUT, n. *ār'nūt* [AS. *eorhnot*: contr. for *earth-nut*]: a sort of nut-like root, commonly found in hilly grass-pastures, its presence in the earth being indicated by its tuft of white flowers on a slender stem; the tuberous roots of *Bunium bulbocastanum* and *B. flexuosum*, ord. *Umbelliferae*, eaten under the name of pig-nuts or earth-nuts.

ARNOTT, NEIL, M.D.: 1788–1874, March 2; b. Arbroath; educated at the grammar school of Aberdeen, and at Marischal College in the same city. A. studied medicine at Aberdeen and London; was some years in the naval service of the East India Company, and in 1811 a medical practitioner in London. He was appointed, 1815, physician to the French embassy, and afterward to the Spanish embassy. In 1836 Dr. A. was appointed a member of the senate of the Univ. of London. In 1837 he was named a physician extraordinary to the queen. He died in London. Besides his *Elements of Physics, or Natural Philosophy, General and Medical* (1827), Dr. A. pub. a treatise on *Warming and Ventilating* (1838), *On the Smokeless Fireplace, Chimney Valves*, etc. (1855), and other treatises. He made useful inventions (see WATER-BED: WARMING AND VENTILATION). His

## ARNOTTO—ARNSBERG.

genius showed itself in a very unusual combination of inventive power with the art of popular exposition.

ARNOTTO, or ARNATTO, n. *är-nōt'tō*, or *är-năt'tō* [said to be a corrupted W. I. word]: also spelled ANNOTO, ANNOTTA, ANNATTO; also called ROUCOU, and on the continent of Europe, ORLEAN: a red coloring matter obtained in South America and the West Indies from the reddish pulp surrounding the seeds of the Arnotto-tree (*Bixa orellana*) by washing, maceration, fermentation, and subsequent evaporation. It appears in commerce in cakes or balls of 2 to 4 lbs. weight, wrapped in leaves, externally brown, internally of pale blood-red or yellowish-red color, and which have a peculiar animal smell and an astringent taste. Pure A. seldom appears in the market. It is obtained by the mere rubbing off and drying of the red pulpy pellicle which covers the seed; but that which is thus obtained is very pure, and occurs in small round or angular lozenges. The Indians rub this coloring matter into the skin of their whole body, thus intending both to adorn themselves, and to obtain protection against the bites of mosquitoes. A. is used in the medicine of civilized countries, for coloring plasters, ointments, etc.; and to a considerable extent by farmers for giving a rich color to butter and cheese. It is also used in dyeing, although it does not produce a durable color. It is employed to impart an orange tint to simple yellows. It is an ingredient in some varnishes. It dissolves in alkalies, producing a brown solution, from which it is precipitated by acids. It imparts little color to water, but dissolves in alcohol; alcohol and sugar of lead throw down a brick-red precipitate from the alcoholic solution. In South America, A. is very extensively mixed with chocolate, not only for the sake of the color, but also for the improvement of the flavor.—The genus *Bixa* belongs to the natural order *Flacourtiaceæ* (q.v.), and is distinguished by complete flowers with simple stigma, a hispid calyx of five sepals, and a two-valved capsule. The A. shrub is a native of tropical America, but has been introduced into other warm countries. It grows to the height of 7–8 ft., and has heart-shaped, pointed leaves and large flowers of a peach-blossom color, which grow in loose clusters at the extremities of the branches. The capsules are oblong, and contain 30–40 seeds enveloped in red pulp (the A.). The seeds are said to be cordial, astringent, and febrifugal. The roots are used in broth. They have the properties of A. in an inferior degree.

ARNSBERG, *ärns'bërg*: one of the three depts. of the Prussian province of Westphalia (q.v.), having 2,900 sq. m. With the exception of the valley of the Lippe, the whole dept. belongs to the highlands of the Lower Rhine. Only in a few of the valleys is there good arable soil; on the other hand, there is a great deal of good timber, more than a third of the whole area consisting of forests. But the principal resources of the district are its subterranean riches, in coal, iron, lead, silver, etc. Its abundant water.



## ARNSTADT—AROMA.

power has also led to the establishment of numerous factories, mills, etc. Pop. (1890) 1,342,711.

ARNSBERG, chief town of the dept., is on the Rhur, 44 m. s.e. from Münster. It has several manufactures, such as linen, broadcloth, potash, etc. In the orchard below the castle is still pointed out the spot where the famous *Femgerichte* (q.v.) of A. was held. Pop. (1890) 6,733.

ARNSTADT: *árn'stát*: chief town in the principality of Schwarzburg-Sonderhausen, in a picturesque country on the banks of the Gera, 12 m. s. of Erfurt. It is one of the oldest Thuringian cities, traceable as far back as A.D. 704. Formerly it was the chief emporium for the trade in fruit and timber between the fertile lowlands and the Thuringian forest region, but is now a manufacturing town, employing many hands in weaving, glove-making, brewing, pottery, etc. A rich vein of rock-salt has been recently discovered in the neighborhood of the town, and a new copper-mine opened. Pop. (1880) 10,516; (1890) 11,537; (1900) 14,421.

AROINT, or AROYNT, ad. *ǎ-roynt'* [OE. *rynt*, begone; get out of the way: Icel. *ryma*, to make room: said to be a corruption of L. *averruncus*, averting evil, but hardly probable]: in OE., begone; away; avaunt thee.

AROKSZALLAS, *á'rök-sál ásh'*: t. of Jazygia, Hungary, 44 m. n.e. from Pesth, an entrepôt for the trade between that city and Upper Hungary. It stands in a plain on the Gyöngöys Patak, a small stream, by which it is almost encircled. The surrounding country is fertile, and affords excellent pasture. Pop. (1890) 11,189.

AROMA, n. *ǎ-rō'mă* [Gr. *arōma*: F. *arome*]: the fragrant principle in plants; an agreeable odor or smell. AROMATIC, a. *ǎr'ō-măt'ík*, or AR'OMAT'ICAL, a. spicy; fragrant. AR'OMAT'ICALLY, ad. -*lī*. AROMATICS, n. plu. *ǎr'ō-măt'íks*, spices or perfumes. AROMATIZE, v. *ǎ-rō'mă-tíz*. to render fragrant; to perfume. ARO'MATIZ'ING, imp. ARO'MATIZED, pp. -*tízd*. AROMATIZATION, n. *ǎ-rō'mă-tī-ză'shŭn*, the act of rendering aromatic. AROMATIZER, n. *ǎ-rō'mă-tī-zér*, one who. AROMATOUS, a. *ǎ-rō-mă-tŭs*, full of fragrance; impregnated with a fine odor.

AROMA: term sometimes employed to designate substances whose extremely minute particles are supposed to affect the organ of smell so as to produce particular odors, and frequently as synonymous with *odor*. The particles diffused through the atmosphere, and affecting the olfactory nerves—if the theory of particles of matter so diffused be correct—must indeed be extremely minute, as odoriferous substances such as musk, the smell of which is felt at a considerable distance, continue to diffuse their odor, and according to this theory, these particles, for years, without sensible diminution of weight. See NOSE, etc. The term A. is usually employed only with reference to particular kinds of odors, not easily defined or distinguished in words. Thus, we speak of the A. of roast meat, and of the A. or *aromatic* smell of hyssop, mint, and other plants. Aromatic smells

## AROMATICS—AROMATIC VINEGAR.

are very characteristic of some natural orders of plants, as *Labiatae* (Mint, etc.) and *Compositae* (Milfoil, etc.). They have been generally supposed to depend upon essential oils, but resins are often equally aromatic.

**AROMATICS:** a class of medicines, which owe their properties to the essential oils, to benzoic and cinnamic acids, to volatile products of distillation, or to odorous glandular secretions. The plants that contribute to this class of medicines are those which yield essences, camphor, or odorous resins, and among the families which yield the most important aromatics are the *Labiatae*, *Umbelliferae*, *Lauraceae*, *Myrtaceae*, *Aurantiaceae*, *Coniferae*, *Scitamineae*, *Orchideae*, etc. In some cases, the aromatic matter is diffused through all parts of the plant, but it is usually condensed in particular organs, such as the root, in the case of ginger and galanga; or the bark, in the case of cinnamon, canella, and cascarella; or the flowers, as in the case of cloves; or the fruit, as in the case of anise and vanilla; or the wood, as in the case of sandal-wood and aloes-wood; or the leaves, as in the case of most of the *Labiatae*, *Umbelliferae*, etc.

Aromatics may be arranged in the following sub-classes: (1) Those in which the active principle is an essential oil, as the oil of thyme, lavender, cajeput, neroli, fennel, etc. (2) Those containing camphor, or an allied body, such as artificial camphor obtained from turpentine. (3) Bitter aromatics, in which there is a mixture of a bitter principle and an essential oil, as chamomile, tansy, wormwood, etc. These are tonics and vermifuges. (4) Those of which musk is the type, such as civet and amber; and certain plants with a musk-like odor, such as *Malva moscata*, *Mimulus moschatus*, and *Hibiscus abelmoschus*. (5) Those containing a fragrant resin, as benzoin, myrrh, olibanum, storax, and the balsams of Peru and Tolu, which have stimulant properties. (6) Lastly, those artificially produced by destructive distillation, as tar, creosote, benzol, or the various empyreumatic oils.

As a general rule, these substances act as diffusible stimulants of more or less power, and as antispasmodics, while those in which a bitter principle is present act as vermifuges and tonics. The whole class was formerly regarded as possessing disinfectant and antiseptic properties, and there is no doubt that some, as coal-tar, creosote, etc., strongly possess this property. In this country we usually associate aromatics with other medicines; but in France aromatic infusions, lotions, baths, etc., are much prescribed. For illustration, this is the rule for the composition of Aromatic infusion: Take equal parts of the leaves of sage, ordinary and lemon thyme, hyssop, organum, wormwood, and mint: infuse 50 parts of these leaves in 100 parts of boiling water.

**AROMATIC VINEGAR:** differing from ordinary vinegar (which is acetic acid diluted with water) in containing certain essential oils which impart an agreeable fragrance.



## ARONIA—ARPEGGIO.

It is generally prepared by adding the oils of cloves, lavender, rosemary, and *Acorus Calamus* (and sometimes camphor) to crystallizable acetic acid, or by distilling the acetate of copper in an earthen retort and receiver, and treating the liquid which passes over with the fragrant oils mentioned above. A. V. is a very pleasant and powerful perfume; it is very volatile, and when snuffed up by the nostrils is a powerful excitant, and hence is serviceable in fainting, languor, headache, and nervous debility. A. V. is generally placed on a sponge in a smelling bottle or in a *vinaigrette*; it can also be purchased as a liquid in phials; and a drop or two allowed to evaporate into a sickroom overpowers, but does not destroy, any unpleasant odor. The liquid must, however, be cautiously dealt with, as it is highly corrosive.

ARONIA: see CRATÆGUS.

AROOSTOOK, *a-rôs'took*: river rising in the n. of Maine, and emptying into the St. John in New Brunswick, after a course of abt. 120 miles. It has historical interest from its connection with the long-agitated question of the n.e. boundary between British America and the United States.

AROSE, v. *ă-rôz*: see ARISE.

AROUND, prep. *ă-rownd* [*a*, on, and *round*]: about; on all sides: AD. in a circle; on every side.

AROURA, n. *ă-rov'ra* [L. *arura*; Gr. *aroura*—from L. *aro*; Gr. *aroō*, to plow]: corn land; a corn-field; a Grecian measure of superficial extent, a quarter of a plethron, and containing one and a half hektoi. Porter makes it equivalent to 107'37833 sq. feet.

AROUSE, v. *ă-rowz'* [AS. *a*, intensive, and *rouse*, a secondary form of *raise*]: to stir up; to excite; to stir from rest to activity. AROUS'ING, imp. AROUSED, pp. *a-rowzd'*.

AROW, ad. *ă-rô'* [*a*, on, and *row*]: in a row; one after the other.

ARPAD, *ăr'pád*: the national hero of Hungary: son of Amos, the leader under whom the Magyars first gained a footing in Hungary: chosen duke on his father's death, 889, and by incessant warfare with the Bulgarians, Wallachians, Moravians, etc., extended the first conquests of the Magyars on all sides. He also made more than one successful incursion into Italy about 900, and returned laden with booty. He died 907, leaving his son in supreme command. The A. dynasty became extinct in the male line with Andreas III., 1301. A. yet lives in the popular songs of the country, and his history, even in the oldest chronicles, is mixed up with a deal of legendary matter.

ARPEGGIO, h. *ăr-pěd'jô* [It.—from *arpa*, a harp]: in *music*, a chord of which the notes are given, not contemporaneously, but in quick succession, with a harp-like effect. From any one chord, several forms of A. may be

## ARPENT—ARQUEBUS.

produced. Bass chords thus treated form an *Alberti Bass*, so named from Domenico Alberti (1730), a popular singer and player, who often played the bass in this style. A. sometimes means a harp-accompaniment.

ARPENT, *âr'pent*: old French land-measure, corresponding to acre. The name is from the ancient Gallic *aripennis*, identified by Columella with the Roman *actus*, or half *jugerum*. Ordinarily an A. may be reckoned as five-sixths of an acre; but the precise comparative value of the three most in use will be seen in the following table:

|                                      | French Hectares. |
|--------------------------------------|------------------|
| Acre, English imperial or statute, . | 0·40466          |
| Arpent, of Paris, . . . . .          | 0·32400          |
| “ d’ordonnance, . . . . .            | 0·48400          |
| “ common, . . . . .                  | 0·40000          |

ARPINO, *âr-pē'nō*, the *Arpinum* of the ancients: t. of s. Italy, birthplace of Cicero and Caius Marius, in the province of Caserta, 65 m. n. by e. of Naples, on the lower ridge of a lofty hill, abt. 6 m. to the left of the river Garigliano, the ancient Liris. The old town, in early Roman times, was on the top of a steep rock, forming part of the territory of the Volscians. Many remains of the ancient structures are still seen, especially a cyclopean wall, which runs along the n. brow of the hill occupied by the present town, and extending to the ancient citadel. About B.C. 188, the citizens received the freedom of the city of Rome, with all its privileges, and Arpinum, during the later years of the republic, was a flourishing municipal town.

Manufactures of woolen cloth, parchment, paper, and leather are carried on. The town has a charming appearance from the highly picturesque woods and mountains around. Iron, white marble, variegated red marble, and marble of a yellowish color are got in mines and quarries in the neighborhood. Pop. abt. 6,000.

ARQUA, *âr-kwâ'*: village in the prov. of Padua, Venice, 12. m. s.w. of Padua, in the heart of the Euganean Hills. Petrarch's furniture is still preserved in the house in which he died here (1374, July 18), and his monument of red marble is in the churchyard. Pop. 1,200.

ARQUATED a. *âr'kwā-těd* [L. *arquatus*—from *arcus* (*arcus*) a bow]: bent like a bow; curved.

ARQUEBUS, n. *âr'kwe-bŭs* [F. *arquebuse*: It *archibuso*: Dut. *hæck-busse*, a gun fired from a rest—from *haak*, a hook; *bus*, a gun]: an old-fashioned hand-gun. ARQUEBUSIER, n. *âr'kwe-bŭs-ēr'*, a soldier armed with an arquebus. ARQUEBUSADE, n. *âr'kwe-bŭs-ād'*, originally a shot-wound from an arquebus, now applied to a distilled water used for the cure of wounds or bruises; other spellings are, ARQUEBUSE, HARQUEBUSS, etc.

ARQUEBUS, or HARQUEBUS: the first form of hand-gun which could fairly be compared with the modern musket. Those of earlier date were fired by applying a



## ARQUERITE—ARRACACHA.

match by hand to the touchhole; but about the time of the



Arquebusier.

battle of Morat, 1476, guns were used having a contrivance suggested by the trigger of the arbalest or cross-bow, by which the burning match could be applied with more quickness and certainty. Such a gun was the A. Many of the yeomen of the guard were armed with this weapon, on the first formation of that corps in 1485. The A. being fired from the chest, with the butt in a right line with the barrel, it was difficult to bring the eye down low enough to take good aim; but the Germans soon introduced an improvement by giving a hooked form to the butt, which elevated the barrel; and the A. then obtained the name of the *haquebut*. Soldiers armed with these two kinds of weapon were designated *arque-*

*busiers* and *haquebutters*—the former were common in the English army in the time of Richard III., the latter in that of Henry VIII.

**ARQUERITE**, n. *âr'kě-rīt*: a native silver amalgam, occurring in crystals and arborescent crusts in the mines of *Arqueros*, near Coquimbo, in Chili.

**ARQUIFOUX**, n. *âr'kwî-fó* [F.]: in *commerce*, an ore of lead used by potters to give a green varnish to the articles which they manufacture.

**ARRACACHA**, *âr-ră-kă'chă* (*Arracacha esculenta*): plant of the natural order *Umbelliferae*, native of the elevated table-lands in the neighborhood of Santa Fê de Bogota and Caraccas, and of regions of similar climate in other parts of tropical America. It is much cultivated in its native country for its roots, used as an esculent. The root divides into a number of parts, which resemble cows' horns or large carrots. When boiled, they are firm and tender, with a flavor not so strong as that of a parsnip. The plant is very like hemlock, and has a similar heavy smell. Humboldt, indeed, referred it to the genus *Conium* (Hemlock), but it has since been made the type of a new genus. The flowers are in compound umbels, and are of a dull purple color. The A. was at one time very strongly recommended as a substitute for potatoes; it was introduced into Britain through the exertions of the Horticultural Soc., and its cultivation perseveringly attempted; but it has been found unsuitable to the climate of Britain



Arracacha.

## ARRACK.

and of other parts of Europe, where it has been tried, perishing on the approach of the frosts of winter without having perfected its roots. The dry weather of summer is also unfavorable to it. The climate of the s. of Ireland resembles that of its native regions more than any other in the British Islands. It seems to require a very regular temperature and constant moisture. In deep, loose soils, it yields a great produce. It is generally propagated, like skirret, by offshoots from the crown of the root. By rasping the root and washing, a starch, similar to arrow-root, is obtained,—There is another species of the same genus, *A. moschata*, a native of the same regions, the root of which is uneatable.

ARRACK, n. *ār'rāk* [Ar. *araq*, sweat, juice], (called also RACK or RAKI): the East Indian name for all sorts of distilled spirituous liquors, but chiefly for that procured from toddy or the fermented juice of the cocoa and other palms, and from rice. The palms in other tropical countries furnish a fermented beverage similar to the toddy of India, and in a few instances also it is distilled, but arrack essentially belongs to India and the adjacent countries. The cocoa-nut palm (*Cocos nucifera*) is a chief source of toddy or palm wine, and is obtained from trees ranging from twelve to sixteen years old, or when they show the first indication of flowering. After the flowering shoot or spadix enveloped in its spathe is well advanced, and the latter is about to open, the toddy-man climbs the tree and cuts off the tip of the flower-shoot; he next ties a ligature round the stalk at the base of the spadix, and with a small cudgel he beats the flower-shoot, and bruises it. This he does daily for a fortnight, and if the tree is in good condition, a considerable quantity of a saccharine juice flows from the cut apex of the flower-shoot, and is caught in a pot fixed conveniently for the purpose, and emptied every day. It flows freely for fifteen or sixteen days, and less freely day by day for another month or more; a slice has to be removed from the top of the shoot very frequently. The juice rapidly ferments, and in four days is usually sour; previous to that, it is a favorite drink known in India by the natives as callu, and to the Europeans as toddy. When turning sour, it is distilled and converted into A., known better to the Hindus by the name of naril, and by the Cingalese as pol or nawasi. A similar spirit is made largely from the magnificent fan-leaved palm, *Borassus flabelliformis*, and also from the so-called date-sugar palm, *Arenga saccharifera*. Large quantities of arrack are made from fermented rice prepared as malt—both in India, Ceylon, and Batavia; in the last-mentioned place, sugar and molasses are added to the rice.

It is probable that the use of arrack is more widely diffused among the human race than the produce of the vine (wine and brandy) and of barley (whisky, beer). The date-palm of the Sahara, the oil-palm of w. Africa, and the cocoa-nut palm of the Pacific Islands are made to yield it.

The unscientific method of preparing these alcoholic



## ARRAGONITE—ARRAH.

spirits renders them generally very distasteful to European taste, the process of rectification being rarely if ever employed. Some carefully prepared samples of great age, however, find favor, and are used in making punch and other drinks, not only in India and Java, but small quantities also find their way to Britain, for the gratification of palates trained in India. The cocoa-nut tree is especially valuable for this industry, because it bears twelve times in the year after it once begins, and continues bearing for as much as forty years. It is the rule, therefore, to prevent undue exhaustion of so valuable a tree, to discontinue the collection of juice at intervals, and allow the natural process of fruit-bearing to go on: in this way, it is usual to divide the year between the two crops. Of late years a considerable amount of rum has been produced in the East Indies from the sugar-cane and the molasses yielded by it. This is often called arrack by the natives, and leads to errors as to the statistics of the latter material. The word *Saki*, used by the Japanese for rice spirit, seems only an alteration of *Raki* or Arrack. An imitation A. is prepared by dissolving benzoic acid in rum, in the proportion of 20 grains of the former to 2 pounds of the latter.

ARRAGONITE, n. *är-räg'ö-nīt* [*Arragon*, in Spain]—also spelled ARAGONITE: a mineral essentially consisting of carbonate of lime, and so agreeing in chemical composition with calcareous spar (q.v.), but differing from it in the form of its crystals, of which the primary form is a rhombic prism with angles of  $116^{\circ} 16'$  and  $63^{\circ} 44'$ , the secondary forms being generally prismatic and pyramidal. The effect of heat on them shows another difference, A. being reduced to powder by a heat in which calcareous spar remains unchanged. Such differences between minerals of the same chemical composition appeared very improbable, and when Stromeyer, 1813, detected the presence of a little carbonate of strontia in A., they were immediately ascribed to this as their cause; but it has since been shown not only that the quantity of strontia is very small, variable, and therefore to be regarded as accidental, but also that the differences between the two minerals may be accounted for by difference of temperature when crystallization was taking place. A. appears to be the product of a crystallization taking place at a higher temperature than that in which calcareous spar is produced; and accordingly it is frequent in volcanic districts and in the neighborhood of hot springs, as at Carlsbad. It is frequently found in trap-rocks, as in Scotland. It sometimes occurs stalactitic. Its crystals are sometimes prisms shortened into tables, sometimes they are lengthened into needles. Twin crystals (*macles*) are very common. *Satin Spar* is a variety of it, in which the crystals are of a fine fibrous silky appearance, and combined together into a compact mass. *Flos ferri* (i.e., flower of iron) is a name given to a coralloidal variety which sometimes occurs in iron mines.

ARRAH, *är'rā*: largest town in the dist. of Shahabad

## ARRAIGN—ARRAIGNMENT.

Bengal; administrative headquarters of the district. It is a municipality, in a fertile country. It is on the route between Dinapore and Ghazipore, 25 m. w. of the former, and 75 m. e. of the latter. During the mutiny of 1857, A. was of interest second only to Cawnpore, Delhi, and Lucknow, connected as it was with a heroic defense, a heavy disaster, and a brilliant victory. The defense was that of an isolated house, for eight days, against 3,000 sepoys with 2 field-pieces, the garrison consisting of less than 20 whites, all civilians, and 50 Sikhs, whose fidelity was doubtful till proved by trial. The disaster was the nocturnal surprise in the jungle of a detachment almost entirely European, sent to the relief of the beleaguered dwelling—the loss having been 290 out of 415. The victory was won by a force of 172 men, 12 of them mounted volunteers, and 3 guns, over a host numbering nearly 20 to 1. In fact, A., happily with the exception of the cold-blooded massacre of women and children, presented, in miniature, nearly all the phases of the most formidable and eventful insurrection on record: see Kaye's *History of the Sepoy War*. Pop. of A. (1891) 46,905.

ARRAIGN, v. *ăr-rān'* [OF. *arraigner*, or *aragnier*, to discourse with, to arraign—from mid. L. *ad ratiōnēs stārē*, to plead—from *ratiōnēs*, pleadings in a suit—from L. *ratiōnem*, reason, argument]: to call one to account; to set as a prisoner at the bar of a court of justice; to charge with faults; to accuse publicly. ARRAIGN'ING, imp. ARRAIGNED, pp. *ăr-rānd'*. ARRAIGN'ER, n. one who. ARRAIGNMENT, n. *ăr-rān'mēnt*, the act of setting a prisoner before the bar of a court for trial; accusation.—SYN. of 'arraign': to accuse; impeach; censure; charge; criminate; indict.

ARRAIGNMENT, in the practice of the Criminal Law: calling a prisoner by his name to the bar of the court to answer the matter charged upon him in the indictment. And having the presumption of innocence in his favor, it is the law, and so laid down in the most ancient books, that, though charged upon an indictment of the highest nature, he is entitled to stand at the bar in the form and in the garb of a free man, without irons or any manner of shackles or bonds, unless there be evident danger of his escape, or of violence at his hands. When arraigned on the charge of treason or felony, the prisoner is called upon by name to hold up his hand, by which he is held to confess his identity with the person charged. This form, however, is not an essential part of the proceedings at the trial, and it is sufficient for the prisoner, when arraigned, to confess his identity by verbal admission or otherwise. When thus duly arraigned, the indictment is distinctly read to the accused, and he then either confesses the fact—that is, admits his guilt—or he puts himself upon his trial by a plea of *Not guilty*. Formerly, one of the incidents of the A. was the prisoner *standing mute*, as it was called—that is, refraining from, or refusing, a direct answer to the indictment; in which case the court proceeded



## ARRAN.

to inquire whether the silence was of malice on the part of the prisoner, or was produced by the visitation of God, and to deal with him accordingly. But now it is lawful for the court to order the proper officer to enter a plea of 'Not guilty,' on which the trial shall proceed, as if the plea had been by the prisoner himself. Where there is reason to doubt, however, that the prisoner standing mute is sane or not, inquiry is had forthwith, resulting either in the entering of the plea 'Not guilty,' or in delivering to custody of a prisoner found insane.

According to Sir Matthew Hale, the term A. is derived from *arraiser, ad rationem ponere*, to call to account or answer, which in ancient French law would be *ad-resoner*, or, abbreviated, *a-resner*. See TRIAL: INDICTMENT: INFORMATION: PROSECUTION: PLEA: VERDICT: NOT PROVEN.

AR'RAN: island in the mouth of the Firth of Clyde, Scotland; about 5 m. s.w. of Bute, 13 w. of Ayrshire, and 4 e. of Cantire, from which it is separated by Kilbrennan Sound. It is of oval form, about 20 m. long and 12 broad; 165 sq. m., of which about 15,000 acres, or a seventh part, are cultivated. The general aspect of A. is mountainous and heathy, and in the n. the jagged peaks are singularly grand. Around the coast is a low belt of ground, with lofty cliffs on the s. and s.w., from which the country rises abruptly. The highest point is Goatfell (in Gaelic named *Gaoth Bheinn* or *Beinn Ghaoith*, 'Wind Mountain'), an obtuse pyramid, 2,865 ft. high, a prominent feature of the island. From its sides slope the romantic glens of Rosa and Sannox, and at its base to the s.e. opens Brodick Bay, at the head of which lay, until lately, Brodick village. The houses which composed it have now been removed, and a new village has sprung up on the opposite side of the bay, called Invercloy, where there is a spacious hotel. To the s. of this, round a bluff headland, is Lamlash Bay, the chief harbor of A., and the best on the Firth of Clyde, sheltered by Holy Island, once the seat of a monastery. A picturesque mass of columnar basalt, 900 or 1,000 ft. high, succeeds. Farther s. lies Whiting Bay, near which are two cascades, 100 and 50 ft. high respectively. At the s.e. point of A. is Kildonan Castle, opposite which is the small isle of Pladda, crowned by a light-house. Large caverns are in the cliffs of the s. and s.w. coast. In one of these, 'the King's Cave,' in the basaltic promontory of Druimodune, Robert the Bruce hid himself for some time. Shiskan Vale, opening into Druimodune Bay, is the most fertile part of A. Loch Ranza, a bay in the n. end of A., runs a mile inland, and is a herring-fishing rendezvous. There is daily communication with A. by means of steamboats from the Clyde, the ports touched at being Brodick, Lamlash, and Corrie.

The geology of A. is almost unique, and displays a greater succession of strata than any other part of the British Isles of equal extent. The s.e. half of A. consists of Devonian sandstone, extending from the e. coast 4 or 5 m. inland, and running s.w. from Brodick beyond the centre of the

## ARRAN—ARRANGE.

island; and of trap rocks and carboniferous strata, which occupy the middle and w. portions. The n.w. half consists of a central granite nucleus, including Goatfell, bordered on the w. by a tract of mica-slate, and on the n.e. and s. by lower Silurian rocks, which, again, have a run of Devonian sandstone on the e. and s. Lias and oolite lie on the mica-slate. The streams in A. are only riviulets, and one of them tumbles over a precipice 300 ft. high. Some level parts in the s. half of A. are fertile. The chief crops are oats and potatoes. Cattle, sheep, fish, and oats are exported. The greater part of A. belongs to the Duke of Hamilton, whose seat is Brodick Castle. A. forms part of the county of Bute, and contains two parishes. Many antiquities occur, such as cairns, unhewn obelisks, monumental stones, and Druidical circles. Several stone coffins were found in a cairn 200 ft. in circumference. Loch Ranza Castle, now in ruins, was once a residence of the Scots kings. See works by Landsborough and Bryce. Pop. of A. (1894) 5,234.

AR' RAN, SOUTH ISLES OF: three small islands lying n.e. and s.w. across the entrance to Galway Bay, about 4 m. off the w. coast of Ireland, and 27 w. of Galway city. They form the barony of A., and give the title of earl to the Gore family. Total area, 11,287 acres. The principal or w. island, Inishmore, is 7 m. long and 2 broad; Inishmaan, or 'Middle Isle,' is next; and then Inishere to the s.e. The islands consist of the carboniferous limestone of the bed of Galway Bay, and rise to the height of 100 to 200 ft. on the w. side, ending in cliffs facing the Atlantic. Most of the land is rudely cultivated. The chief crops are rye, oats, and potatoes. Most of the inhabitants engage in fishing; and the *corràgh* or wicker-work skiff is still seen here. They are subject to famines from parching rainless w. winds in August, destroying the potato-crop. These islands contained at one time 20 churches and monasteries. Inishmore was the centre of these, still known as Aran-na-naomh, or 'Arran of the Saints.' Many pilgrims still visit the old shrines and relics scattered through the islands. St. Kenanach Church, built in the 7th c., still stands, all but its stone roof, and the stone oratories and little bee-hive stone huts of the monks of the 6th and 7th centuries remain. There are nine circular cyclopean fortresses of unhewn, uncemented stones (portions of the walls still being 20 ft. high), supposed to have been built in the 1st c. by the Fir-Bolg or Belgæ. The largest of these, Dun-Aengus, on a cliff in Inishmore, 220 ft. high, is one of the most magnificent barbaric monuments in Europe. Pop. in 1871, 3,050, of which number 2,122 inhabited Inishmore, 433 Inishmaan, and 495 Inishere. Of the total pop. all but 57 were Roman Catholics; 504 could read and write, 143 could read only, and the rest were illiterate. Estimated pop. (1903) 7,500.

ARRANGE, v. *är-rānj'* [F. *arranger*, to set in order—from F. *rang*, a row: W. *rhenc*: Scot. *raign*, a row, a ring]: to dispose in a row or line; to put into proper order;



## ARRANGING—ARRAS.

to adjust; to dispose. ARRANG'ING, imp. ARRANGED, pp. *ăr-rāngd'*. ARRANG'ER, n. one who. ARRANGEMENT, n. *ăr-rānj'měnt*, putting into proper order; settlement; a classification.—SYN. of 'arrange': to adjust; accommodate; adapt; dispose; settle; prepare; determine.

ARRANG'ING, in Music: adapting a piece of music so as to be performed on an instrument or instruments different from those for which it was originally composed; as when orchestral or vocal compositions are set for the pianoforte, or the reverse. An arrangement is often a mere lifeless transposition of the original, the only guiding principle being the mechanical possibility of performance. Of this kind are most of the pianoforte arrangements of the orchestral works of Mozart, Beethoven, etc.—partly from the arranger working merely for hire, and partly from a mistaken reverence for, and fear of altering, the original. It is different when an arranger, who thoroughly comprehends the spirit of the original, takes advantage of the peculiar means of expression afforded by the new form of presentation, to reproduce as much as possible the original effects. In this last respect, the arrangements of Franz Liszt have excelled all others, although in some cases he may have overstepped the boundary of propriety. See POT-POURRI: FANTASIA.

ARRANT, a. *ăr-rănt* [AS. *eargian*: OE. *argh*, to be a coward: Ger. *arg*, bad: AS. *earg*, evil (see ARCH 2)]: notorious; impudent; infamous. AR'RANTLY, ad. *-lî*. Note.—Mr. Skeat says *arrant* is corrupted from Prov. and OE., *arghand*, timid, cowardly, the participle of *argh*, to be cowardly.

ARRAS, n. *ăr-răs* [*Arras*, a town in France where first made]: tapestry; hangings for rooms, woven with figures: see TAPESTRY.

ARRAS, *ăr-răs'* (ancient *Nemetacum*): fortified town, cap. of Pas-de-Calais, as it was formerly of the province of Artois, France; on the banks of the Scarpe, partly on an eminence and partly on a plain; consists of four divisions—the city, upper town, lower town, and citadel. It is a principal station on the French Northern railway, distant from Paris by this route 134 m., and from Brussels 97. The houses are of hewn stone; in the lower town, they are handsomely built and uniform; the streets straight and wide, set off with several fine squares, and many beautiful public buildings. Among the principal edifices are the Cathedral of Notre Dame, the residence of the prefect, the town-hall, the theatre, and the public library.

A. ranks as a fortified town of the third class, its fortifications being the first that were constructed by the celebrated Vauban, according to his own system. It has been the seat of a bishop since 390, and two ecclesiastical councils have been held here—in 1025 and in 1490.

The corn-market of A. is the most important in the n. of France. Its principal manufactures are iron-ware, woolen and cotton goods, hosiery, lace, pottery, and

## ARRAY—ARREST.

leather. Its trade, which is considerable, is in corn and flour, oil, wine, and brandy, with the industrial products of the city.

It appears from the writings of Jerome that A. was remarkable for its woolen manufactures in his time; and during the middle ages, it was famed for its tapestry; indeed, the name of the town was transferred to this article of manufacture, and *arras* was the name given in England to the richly-figured hangings that adorned the halls of the kings and the barons.

In 1482, A. with Artois was ceded by the states of the Netherlands to Louis XI. of France; but the inhabitants having revolted, the king laid siege to the town, stormed it, and slew or expelled the people, whom he replaced by others brought from all parts of his dominions, ordering the city to be thenceforward called *Franchise*, to obliterate the very name of A. Soon afterwards (1493) it was ceded to Maximilian of Austria, and was possessed by the Spanish branch of the House of Hapsburg till 1640, when Louis XIII. of France took it after a long siege. By the treaty of the Pyrenees, it was finally ceded to France. A. suffered much in the time of the first French revolution, especially in 1793. Robespierre, the Terrorist, was a native of the town. Pop. (1872) 21,447; (1891) 25,701.

**ARRAY**, v. *är-rā'* [OF. *arroyer*, to set in order: It. *arredare*, to get ready: Icel. *reida*, to lay out: Sw. *reda*, order]: to put in order; to prepare or dispose; to dress; to envelop: N. men drawn up for battle; dress. **ARRAY'ING**, imp. **ARRAYED**, pp. *är-rād'*. **ARRAY'ER**, n. one who.—**SYN.** of 'array, v.': to arrange; dispose; dress; attire; apparel;—of 'array, n.': costume; habit; clothing; garments; vesture; raiment.

**ARRAY'ER**: a title given to certain military officers in England in the early part of the 15th c. There were two in each county, sometimes called Commissaries of Musters.

**ARREARS**, n. *är-rērz'* [F. *arrière*, away, behind: OF. *ariere*, backwards—from L. *ad*, to; *retro*, backwards]: a sum of money past due; what remains unpaid. **ARREARAGE**, n. *är-rēr'āj*, in *OE.*, that which remains unpaid; arrears.

**ARREST**, v. *är-rěst'* [OF. *arrestor*: F. *arrêter*, to detain, to arrest—from mid. L. *ar' restārē*, to arrest—from L. *ad*, *resto*, I stop: It. *arrestare*]: to bring one to a stand; to lay hands upon any one, or upon his goods; to make a prisoner of; to stop; to hinder; to restrain; to seize by authority: N. hindrance; restraint; seizure by authority. **ARREST'ING**, imp. **ARRESTED**, pp. *är-rěst'ēd*. **ARREST'ER**, n., or **ARREST'OR**, n. *-ēr*, one who. **ARREST'MENT**, n. arrest (also, see **ATTACHMENT**, in Law). **ARRESTMENT OF WAGES** (see **GARNISH**—etc.) **AR'RESTA'TION**, n. *-tā'shūn* [F.]: an arrest or seizure.—**SYN.** of 'arrest, v.': to hold; detain; keep; retain; preserve; obstruct; delay; check; hinder; stop; seize; apprehend.

**ARREST**, in Law: to take into custody under authority of the law, on account of the suspicion or commission of crime, or to answer a demand in a civil suit. In civil



## ARREST OF JUDGMENT.

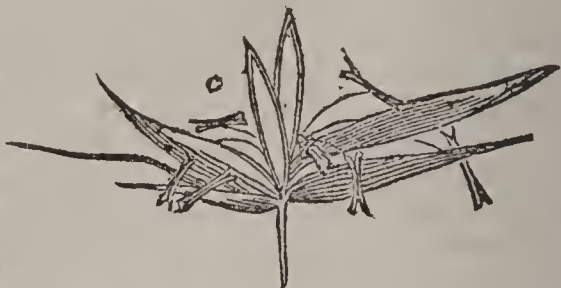
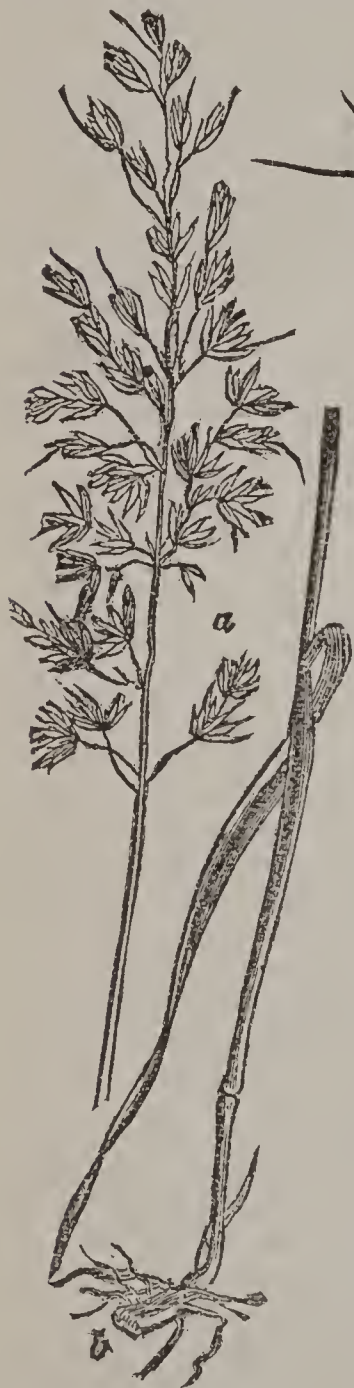
procedure, A. may be defined as the execution of a judicial or prerogative order, in which the liberty of the person may be restrained, and obedience to the law *compelled*; the actual physical seizure or arrest is not essential; it is sufficient if the party be within the power of the officer, and submit to the arrest. Legal provisions concerning A. vary in details in the different states: but generally are as follows: The A. is made by the properly designated authority; usually by the sheriff or one of his deputies; or, in the case of a process of the U. S. courts, by a marshal. Persons not liable to arrest are—*administrators* in suits on the intestate's premises; *ambassadors* and their servants; *attorneys-at-law*; *barristers* attending court, or on circuit; *bail* attending court as such; *bankrupts*, under certain circumstances; *clergymen*, while engaged in the performance of divine service; *electors* attending a public election; *executors* sued on the testator's liability; *heirs* sued as such; *members* of congress and the state legislatures, while attending the respective assemblies to which they belong; etc., etc. In criminal cases an A. can be made by any peace officer, as a justice of the peace, sheriff, coroner, constable, or watchman; and in the instance of a felony committed in the presence of the officer, without a warrant; also, on a reasonable suspicion, or where there are grounds for the belief that a felony is about to be committed, or is in preparation; but without a warrant only in the case of a felony. A private person may, and by law he should, make an A. in case of a felony committed in his presence, or during the commission of a breach of the peace, or upon reasonable suspicion that the person arrested is the felon, if a felony has been committed. But the private person so arresting may be held liable unless he be ready to prove the commission of the felony, or the grounds for suspicion. Any person is liable to A. for crime except ambassadors and their servants. An A. may be made by night as well as by day, and for treason, felony, breach of the peace, or generally for an indictable offense, on Sunday as well as other days; and the officer may break open doors, even of the criminal's own house, even to arrest a person therein not the owner, as may a private person in fresh pursuit, under circumstances which authorize him to make the A. An officer authorized to make the A., whether by warrant or from the circumstances, may use necessary force (but he may not strike except in self-defense); he may kill the felon if he cannot otherwise be taken, and so may a private person in making an A. which he is *enjoined* to make. If a warrant (q.v.) has been issued, the proper person to make the arrest is he to whom it was issued, whether named or described by his office. Any wilful obstruction of a lawful A. is deemed a very aggravated offense.

ARREST OF JUDGMENT: in English legal practice, an expedient; now modified in the United States so that a motion for A. of J. has place when a plaintiff is not entitled to a verdict; or, that without such motion, the court may suspend its decision. The effect

## ARRHENATHERUM—ARRIANUS.

is practically acquittal, though not barring a fresh indictment. See JUDGMENT.

ARRHENATHERUM, *ăr-rhĕn-ăth'ĕr-ŭm*: genus of Grasses, allied to *Holcus* (see SOFT-GRASS) and *Avena* (see



OAT), and distinguished by a lax panicle, 2-flowered spikelets with two glumes, the lower floret having stamens only, and a long twisted awn above the base; the upper floret perfect, with a short straight bristle below the point.—The name *A.* is from the Greek *arrhen*, male, and *ather*, an awn. *A. avenaceum* (*Avena elatior* of Linnæus, also known as *Holcus avenaceus*), common in Europe and N. Amer. is called OAT-GRASS, from the resemblance to the coarser kinds of oats in the general appearance of the panicle. In France, it is very much cultivated for fodder, and is often called FRENCH RYE-GRASS, though it has no affinity to the true Rye-Grass (*Lolium*). At the s. it is known as EVERGREEN GRASS. It is a tall perennial grass, 2-3 ft. high, becomes luxuriant early in the season, and continues long productive. It is rather coarse, has a somewhat bitter taste, endures extremes of heat and cold, drought and moisture, is one of the earliest pasture grasses, and also remains fresh late in the autumn. If cured for hay it should be cut early in the season. A variety having a knotted or bulbous base to the stem, instead of a simple fibrous

### Arrhenatherum:

*a*, panicle, reduced; *b*, root and lower part of culm. reduced; *c*, a single spikelet, natural size.

root, called by some botanists *A. bulbosum*, is an inferior grass and a troublesome weed.

ARRIANUS, *ăr-rĭ-ă'nŭs*, FLAVIUS: b. abt. 100, in Nicomedia, Bithynia: a disciple of Epictetus, the Stoic philosopher, whose system he warmly advocated. The learned men of Athens were highly pleased with the earliest prod-



## ARRIERE—ARRIERE-BAN.

ucts of his pen, and honored him with the freedom of their city. A. had chosen Xenophon as his model of composition, and hence the Athenians called him the young Xenophon. In 124, he was introduced to the emperor Hadrian in Greece, who conferred on him the freedom of the city of Rome. He was appointed prefect of Cappadocia in 136. Under Antoninus Pius, the successor of Hadrian, he was promoted to the consulship. But some four years afterwards, he appears to have retired from public life, and devoted himself to literature in his native place. As the pupil and friend of Epictetus, he edited the Manual of Ethics (*Encheiridion*) left by his master, and wrote the *Lectures of Epictetus*, in eight books, of which only four have been preserved—to be had in Schweighäuser's *Philosophiæ Epictetæ Monumenta*, vol. iii. (Paris, 1827). He wrote also *The Conversations of Epictetus*, a work which has been lost, except a few fragments. The most important work by A. is the *Anabasis of Alexander*, or *History of the Campaigns of Alexander the Great*, which has come down to us entire, all but a gap in the 12th chapter of the 7th book. This book, our chief authority on the subject of which it treats, is of great value. In close connection with it, A. wrote his *Indian History*, giving an account of the people of India. Other writings by A., his letter to Hadrian on *A Voyage round the Coasts of the Euxine Sea*, and another, *A Voyage round the Coasts of the Red Sea*, are valuable with regard to ancient geography. There is still another work by our author—a Treatise on the Chase (*Kynegeticos*)—in which, as well as in the *Anabasis*, he has imitated Xenophon.

A. was one of the best writers of his day. His works bear the marks of care, honesty, and correctness; and they were numerous, though several have not been handed down to our time. All that we are possessed of appear to have had translations into Latin. There is a good French translation of the *Anabasis* by Chaussard, with commentary, 3 vols. (1802), also a good one of the *Lectures of Epictetus* by Thurot (1838). The best critical edition of A. is that by Müller (Paris, 1846).

ARRIERE, *är-rēr'* [Fr.—from L. *ad*, to, towards; *retro*, back]: of an *army*, the rear; arrears.

ARRIERE-BAN, n. *är-rēr'băn* [the French, not understanding the old Teutonic term *heri*, an army, have supposed A. to have the word *arrière* in its composition, which is probably an error]: a general proclamation by which the old French kings summoned to their standard, for the purpose of war, their feudatory vassals, with those also who were in a state of vassalage to them; *fig.*, any general summons issued by an authoritative voice. ARRIERE-FEE, or ARRIERE-FIEF, n. a fee or fief depending on one above it. These fees commenced when dukes and counts, rendering their governments hereditary, distributed to their officers parts of the domains, and permitted those officers to gratify the soldiers under them in the same manner. ARRIERE-VASSAL, n. the vassal of a vassal. ARRIERE-VOUS-

## ARRIS—ARROW.

**SURE**, n. [Fr. *voussure*, coving]: in *arch.*, a secondary arch, an arch placed within an opening to form a larger one. Sometimes it has the effect of taking off the bearing upon a wooden lintel.

**ARRIS**, n. *ăr'is* [OF. *arestē*: mid. L. *arista*, the outer angle of a house]: in *joinery* and *masonry*, the line or edge of meeting of two surfaces. **ARRIS-FILLET**, a. triangular piece of wood used to raise the slates or lead of a roof against the shaft of a chimney or a wall, so as more readily to throw off the rain; used also for forming gutters around skylights. It is sometimes called a *tilting-fillet*. **ARRIS-GUTTER**, n. a wooden gutter shaped like the letter V.

**ARRISH**, n. *ăr'ish*, **ARRISHES**, n. plu. *ăr'ish-ēz*: the Devonshire name for *eddish*, or the grass on stubble fields, and the like. See **EDDISH**.

**ARRIVE**, v. *ăr-riv'* [F. *arriver*, to reach—from It. *arrivare*; mid. L. *adripārē*, to come or bring to shore—from L. *ad*, to; *ripam*, shore]. to come to shore; to reach a place; to gain by effort. **ARRIV'ING**, imp. **ARRIVED**, pp. *ăr-rivd'*. **ARRIV'AL**, n. reaching a place from a distance: the act of coming to.

**ARROBA**, *ă-rō'bă*: a weight commonly used in Spain, Portugal, Brazil, and the principal Spanish and Portuguese colonies. In the first of these countries, it is equivalent to to the English quarter of a cwt., or 28 lbs.; it is nearly the same in Portugal, etc. In Spain, the A. is also a measure for wine, brandy, etc., and contains four of our quarts.

**ARRODE**, v. *ă-rōd'* [L. *arrodo*—from *ad*, to; *rodo*, to gnaw]: to gnaw; to nibble. **ARROSION**, n. *ăr-rōzhŭn*, act of gnawing, or state of being gnawed.

**ARROGATE**, v. *ăr'rō-găt* [L. *arrōgātus*, claimed as one's own; *ar'rōgans*, claiming more than one's due—from *ad*, *rogo*, I ask: F. *arroger*, to arrogate]: to claim more than one's due; to assume more than is proper; to prefer a claim in a spirit of pride; to claim undue power. **AR'ROGAT'ING**, imp. **AR'ROGA'TED**, pp. **AR'ROGANCE**, n. *-găns*, or **AR'ROGANCY**, n. *-găn-sŭ*, or **ARROGATION**, n. *ăr'rō-gă'shŭn*, or **AR'ROGANTNESS**, n. the act or quality of taking too much upon one's self; conceitedness; presumption. **AR'ROGANT**, a. *-gănt*, assuming too much importance; presuming and overbearing; haughty. **AR'ROGANTLY**, ad. *-lŭ*. **ARROGATIVE**, a. *ăr'rō-gă'tiv*, claiming unduly.—**SYN.** of 'arrogance': presumption; self-conceit; pride; vanity; haughtiness; assumption; lordliness; disdain; conceitedness;—of 'arrogant': overbearing; presumptuous; haughty; assuming; lordly; proud; exorbitant; magisterial;—of 'arrogate': to appropriate; usurp; assume.

**ARRONDISSEMENT**, n. *ăr-rōng'dēs-mōng'* [F.—from *rond*, round—from L. *rotundus*, round]: in *France*, a sub-district or division of a department, or territory, for administrative and judicial purposes. See **DEPARTMENT** (French).

**ARROW**, n. *ăr'rō* [AS. *arowe*: W. *aro*, a weapon: Icel *er*, an arrow: Sw. *hurra*, to hurl]: a pointed and barbed



## ARROW-GRASS—ARROW-ROOT.

weapon of war shot from a bow, not now used in European warfare; a long rod pointed sharply, and barbed. See ARCHERY: BOW AND ARROW. ARROWY, a. *ār'rō-ī*, of or like an arrow. ARROW-HEADED, a. *ār'rō-hēd'ēd*, applied to wedge-like alphabetic figures, very ancient; also called cuneiform. ARROW-SHAPED, a. shaped like an arrow. ARROW-SEED, n. seed shaped like an arrow. ARROW-MAKER, n. a maker of arrows. Arrow-makers were formerly called *fletchers* and *bowyers*, and were deemed persons of importance. ARROW-POISON, poison used by savages to tip their arrows with. That of Central America is curarine. AR'ROW-ROOT', n. a farina or flour, prepared from the roots of the West Indian plants *Maran'ta arundinācēa* and *M. Indica*, ord. *Marantūcēa* or *Cannācēa*—perhaps so called from the Indians having employed the root in the cure of wounds made by poisoned arrows. BROAD ARROW, an anc. symbol of rank and authority; the common British government mark placed on their movable property, in the form of a widely feathered arrow, or simply as the broad barb of an arrow, thus—↑; three wedge-shaped marks diverging from their united points, cut on stones as marks or points, from which measurements are made by the ordnance survey department.

ARROW-GRASS, n. English name of the botanical genus *Triglochin*.

AR'ROWHEAD (*Sagittaria*): genus of plants of the nat. ord. *Alismaceæ*, distinguished by unisexual flowers, having three herbaceous sepals and three colored petals, numerous stamens, and numerous carpels, which are compressed, one-seeded, and on a globose receptacle. They are aquatic plants, natives of very different climates, from the tropics to the cold regions of the world.—The COMMON A. (*S. variabilis*) of N. Amer. varies much in the shape of the arrow-shaped leaves which rise above the surface of the water. It is one of those plants which have had an undeserved reputation as cures for hydrophobia. The corms (or solid bulbs), dried and powdered, have sometimes been used for food, but have an acrid, unpleasant taste.—The CHINESE A. (*S. Sinensis*) is a native of China, and has long been cultivated in that country and Japan for its eatable corms, which in a fresh state are somewhat acrid, but abound in starch. It has arrow-shaped, acute leaves, and a branched polygonal scape (leafless stem). The United States has 7 species and 14 varieties.

ARROW-HEADED CHARACTERS: see CUNEIFORM.

ARROW-HEADS: see ELF-ARROW-HEADS.

ARROW-ROOT: a variety of starch extracted from the roots of certain plants of tropical countries. It is a fine starchy farina, valued as a delicacy, and as an easily digestible food for children and invalids. It is obtained from the tuberous roots—or, more correctly, the root-stocks (*rhizomes*)—of different species of the genus *Maranta*, belonging to the natural order *Marantaceæ*, and characterized by solitary ovules, a fleshy style curved downwards, branching stems, and white flowers. The species chiefly

## ARROW-ROOT.

yielding it is *M. arundinacea*, a native of tropical America, cultivated in the West India Islands, and growing about two ft. high, with ovato-lanceolate, somewhat hairy leaves, clusters of small flowers on 2-flowered stalks, and globular fruit about the size of currants. The roots (or rhizomes) contain a large proportion of farina. They are often more than a foot long, of the thickness of a finger, jointed, and almost white, covered with large paper-like scales. They sometimes curve so that the points rise out of the earth, and form new plants. They are dug up when a year old, washed, carefully peeled, and reduced to a milky pulp. Mills for this purpose have been introduced; but in Jamaica the roots are usually reduced by beating in



Arrow-root (*M. arundinacea*):  
a, tubers; b, leaf and flowers; c, stamen and style.

deep wooden mortars; in Bermuda, by means of a wheel-rasp. The pulp is then mixed with much water, cleared of fibres by means of a sieve of coarse cloth or hair, and the starch is allowed to settle to the bottom. The water dissolves, and so removes the greater part of the albumen and salts, the starch quickly settling down as an insoluble powder. Successive washings are employed for further purification. The A. is finally dried in the sun or in dry ing-houses, great care being taken, by means of gauze, to exclude dust and insects. The careful peeling of the roots is of great importance, as the skin contains a resinous matter, which imparts a disagreeable flavor to A.



## ARROW-ROOT.

with which it is allowed to mix. Great care is taken to preserve the A. from impurities; and the knives used in peeling the roots, and the shovels used in lifting the A., are made of German silver. The West Indian A., most esteemed in the market, is grown in Bermuda; the next, and almost equal to it, in Jamaica. The East Indian A. is not in general so highly valued, perhaps because substitutes for the genuine A. more frequently receive that name. *Maranta arundinacea* is now, however, cultivated to some extent both in the East Indies and in Africa. *M. Indica*, which was supposed to be distinct from *M. arundinacea*, is now regarded as a mere variety of it, with perfectly smooth leaves. It is cultivated both in the East Indies and in Jamaica. A. is obtained also from *N. Allouya* and *M. nobilis* in the West Indies, and from *M. ramosissima* in the East.

The amount of fecula or starch present in the roots of the *Maranta* varies according to age, from 8 per cent. in those of the young plant, to 26 per cent. when full grown, at 10 to 12 months old; and the roots then present the following composition in 100 parts:

|   |     |
|---|-----|
| Starch, fecula, or arrow-root, . . . . .          | 26  |
| Woody fibre, . . . . .                            | 6   |
| Albumen, . . . . .                                | 1½  |
| Gummy extract, volatile oil, and salts, . . . . . | 1   |
| Water, . . . . .                                  | 65½ |

A. is exported in tin cases, barrels, or boxes, carefully closed. It is a light, opaque, white powder, which, when rubbed between the fingers, produces a slight crackling noise, like that heard when newly-fallen snow is being made into a snowball. Through the microscope, the particles are seen to be convex, more or less elliptical, sometimes obscurely triangular, and not very different in size. The dry farina is quite inodorous, but when dissolved in boiling water it has a slight peculiar smell, and swells up into a very perfect jelly. Potato-starch, with which it is often adulterated, may be distinguished by the greater size of its particles, their coarser and more distinct rings, and their more glistening appearance. Refined sago-flour is used for adulteration, many of the particles of which have a truncated extremity, and their surface is irregular or tuberculated. A. is also sometimes adulterated with rice-starch and with the common starch of wheat-flour.

Not less than 800,000 lbs. of A. are annually imported into the British Isles. As an article of diet, it is often prepared for invalids and children by merely dissolving it in boiling-water and flavoring with sugar, lemon-juice, wine, etc. It is also often prepared with milk, made into puddings, etc. When most simply prepared, it forms a light meal, which, however, is not very nutritious. See NUTRITION.

A farina somewhat similar to A., and partly known by the distinct name of *Tous les-mois*, is obtained from some species of the allied genus *Canna* (q. v.). But East India A. is in

## ARROYO MOLINOS—ARRU ISLANDS.

part obtained from the tubers of *Curcuma angustifolia*. Other species of *Curcuma* (see TURMERIC), as *C. Zerumbet*, *C. leucorrhiza*, and *C. rubescens*, yield a similar farina; the same tubers which, when young, yield a beautiful and pure starch, yielding turmeric when old. In Travancore, this starch is a principal part of the food of the inhabitants. The young tubers of the Galangal (q.v.), (*Alpinia Galanga*), another plant of the same natural order (*Scitamineæ*), are another source of this farina.—A farina somewhat resembling A., and often sold under that name, is obtained from different species of the nat. ord. *Cycadaceæ*, as from the dwarf fleshy trunks of *Zamia tenuis*, *Z. furfuracea*, and *Z. pumila* in the West Indies, and from the large seeds of *Dion edule* in the lowlands of Mexico.—The starch of Cassava, Manihot or Manioc (see MANIOC), is sometimes imported into Europe under the name of Brazilian A. Potato-starch, carefully prepared, is sometimes sold as English A.; and the farina obtained from the roots of the *Arum maculatum* (see ARUM), as Portland A. Otaheite A. is the starch of *Tacca* (q. v.) *pinnatifida*.—All these, as well as Oswego and Chicago corn-starch—the starch of maize or Indian corn—are so nearly allied to true A. as not to be certainly distinguishable by chemical tests; but the forms of the granules differ, so that they can be distinguished by the microscope.

The name A. is commonly said to have had its origin from the use of the fresh roots by the South American Indians as an application to wounds to counteract the effects of poisoned arrows; and the expressed juice has been recently recommended as an antidote to poisons, and a cure for the stings and bites of venomous insects and reptiles. But it is not improbable that the name is really another form of *Ara*, the Indian name.

ARROYO MOLINOS, *âr-rô'yô mō-lē'nōs*: village in Estremadura, Spain, noted as the scene of Gen Girard's complete discomfiture by Lord Hill, 1811, Oct. 28. Gen. Girard had been sent out by Soult on a plundering foray with 5,000 men, when he was surprised early in the morning by Lord Hill, who, with two regiments, the 71st and 92d, dashed through the rain upon the enemy, who fled in all directions, leaving behind everything, arms, packs, etc.; 1300 prisoners were taken; the whole artillery, colors, baggage, etc. French historians (Thiers, etc.), however, maintain that the battle was 'undecided,' and that their countrymen only retreated in good order, under the pressure of much larger forces.

ARRU ISLANDS, *âr-rô'*: a Dutch possession, of New Guinea, between 5°–7° s. lat., and 134°–135° e. long.; 2,650 sq. m.; pop. 15,000, of whom 400 are Christians, 300 Mohammedans, the remainder heathens. Principal islands are Meykor, Wammer, Udjier, Wokkam, and Babi. Dobo on Wammer is the chief mart. Sago and cocoa nut palms are plentiful, and some tobacco, rice, sugar-cane, maize, and edible roots, etc. are cultivated. The forests yield timber, and the sea yields fish. The rocks give edible nests,



## ARSACES—ARSENIC.

and the woods shelter wild swine, hares, parrots, pigeons, birds of paradise, etc. Cotton goods, iron and copper-ware, Chinese pottery, beads, knives, rum, and arrack are imported, and bartered for mother-of-pearl, trepang, edible nests, pearls, tortoise shell, birds of paradise, etc.

**ARSACES**, *âr'sa-sêz*, or *ar-sâ'sêz*: name of several Parthian and Armenian kings. The accounts concerning them which have been transmitted to us by the ancient historians are exceedingly vague and contradictory; and modern criticism has found itself unable to reconcile or simplify the confused statements: see Armenia: Parthia.

**ARSE**, *ârs* [AS., *ars*, *ears*]: the buttocks or hind-part of an animal.

**ARSENAL**, n. *âr'sě-năl* [OF. *arsenac*; mid. L. *arsēna*, a place for fabricating arms and naval stores: Sp. and F. *arsenal*; It. *darsena*, and *arsenale*, a dock-yard—from Arab. *dârsanah*, a place of work]: a great military or naval repository, where munitions of war are to some extent manufactured, but more particularly stored until required for use. Every national dockyard, every magazine, every armory, is to some extent an A.; therefore the meaning of the word is not definite. The United States arsenals, armories, and depots (1903), are: Arsenals: Allegheny, Penn.; Augusta, Ga.; Benicia, Cal.; Columbia, Tenn.; Fort Monroe, Va.; Frankford, Penn.; Indianapolis, Ind.; Kennebec, Me.; New York; Rock Island, Ill.; San Antonio, Tex.; Watertown, Mass.; and Watervliet, N. Y. Armories: National, Springfield, Mass. Depots, ordnance: Cheyenne, Wyo.; Fort Leavenworth, Kan.; Fort Snelling, Minn.; and Vancouver, Wash. Depots, powder: St. Louis, Mo.; Ellis Island, N. Y.; Dover, N. J.

In England, Deptford is a storehouse for naval clothing and provisions, and Weedon and the Tower (q.v.) great military repositories; the only establishment vast enough to deserve the the name A. is at Woolwich (q.v.).—In France, the chief arsenals are at Cherbourg, Brest, and Toulon.

**ARSENIC**, n. *âr'sě-nĭk* [L. *arsen'icum*; Gr. *arsen'ikon*, arsenic—from Gr. *arsen'ikos*, masculine, male—so named from its superior strength]: a semi-metallic element; a poisonous mineral substance, in the form of a white or steel-gray powder, also called **ARSENIOUS ACID**, *-ĭ-ŭs*.

**ARSENIOUS**, a. pertaining to. **ARSEN'IC**, a., or **ARSENICAL**, a. *âr-sěn'ĭ-kăl*, containing arsenic. **ARSENICATE**, v. *âr-sěn'ĭ-kât*, to combine with arsenic. **ARSEN'ICA'TING**, imp. **ARSEN'ICA'TED**, pp. **ARSENIATE**, n. *âr-sěn'ĭ-ât*, or **ARSENATE**, n. *âr'sěn-ât*, a salt of arsenic acid. **ARSENITE**, n. *âr'sě-nĭt'*, a salt of arsenious acid. **ARSINE**, n. *âr'sĭn*, in chem., a body constituted on the plan of a compound ammonia in which the nitrogen is replaced by hydrogen. **ARSENIDE**, n. *âr'sěn-id*, or **ARSENIURET**, n. *âr'se-nĭ-ŭ-rêt*; arsenic in combination with a metal. **ARSENIURETTED**, a. combined with arsenic. **ARSENOUS**, a. *âr'sěn-ŭs*, pertaining to arsenic, or having it as one of its constituents.

## ARSENIC—ARSENICAL MINERALS.

**ARSENIC:** popular name for arsenious acid (q.v.), but properly restricted to the metal, symbol As, equiv. 75.0. This is rarely found free in nature, but in combination it occurs largely. See **ARSENICAL MINERALS**. The metal is generally prepared from Arsenious Acid,  $\text{As}_2\text{O}_3$ , by mixing it with its own weight of charcoal, placing the mixture in a well-covered crucible, and subjecting the whole to heat, when the metal set free by the charcoal rises, and condenses in the upper part or cover of the crucible. Metallic A. is very brittle, can easily be reduced to powder by hammering, or even pounding in a mortar; and when a freshly cut surface is examined, it presents a brilliant dark steel-gray lustre, which, however, readily tarnishes on exposure to the air. The metal, as such, is not considered poisonous, but when introduced into the animal system, it is there faintly acted upon by the juices, and in part dissolved, at the same time, exhibiting poisonous properties. When heated in the open air, it burns with a peculiar bluish flame, and emits a characteristic alliaceous odor. The only use to which the metal A. is applied in the arts is in the manufacture of leaden shot of the various sizes, when its presence in small quantity in the lead renders the latter much more brittle than it ordinarily is. Of all the compounds of A. the most important is the one already alluded to, Arsenious Acid, an oxide of A. With sulphur, A. forms two important compounds: *Realgar*,  $\text{As}_2\text{S}_2$ , a red, transparent, and brittle substance, which is employed in the manufacture of the signal-light called *White Indian Fire*; and *Orpiment*,  $\text{As}_2\text{S}_3$ , or *King's Yellow*, a cheap pigment of a yellow color. With hydrogen, A. forms arseniuretted hydrogen,  $\text{AsH}_3$ , a very poisonous gas, and one which has been fatal to several chemists.



Native Arsenic.

**ARSENICAL MINERALS:** chiefly in primitive rocks, frequently associated with other metalliferous minerals.—*Native Arsenic*, although nowhere very abundant, is not unfrequently found in mines in Europe, Asia, and America, usually with sulphur and metallic sulphurets. In Britain, it occurs at Tyndrum in Perthshire. It has usually a fine granular character. It is seldom, if ever, quite pure, usually containing a little antimony and iron, and frequently a very little silver or gold.—A very similar and still rarer mineral, found in similar situations, is known as *Arsenic-antimony*, and consists of about two parts of metallic arsenic, and one of metallic antimony.—*Arsenic-silver*, or *Arsenical Silver*, is another very rare mineral, consisting chiefly of arsenic and iron, but containing also about 13 per cent. of silver and a little antimony.—*Arsenic-glance*, found at Marienberg in Saxony, and containing about 3



## ARSENICAL SOAP—ARSENIOSIDERITE.

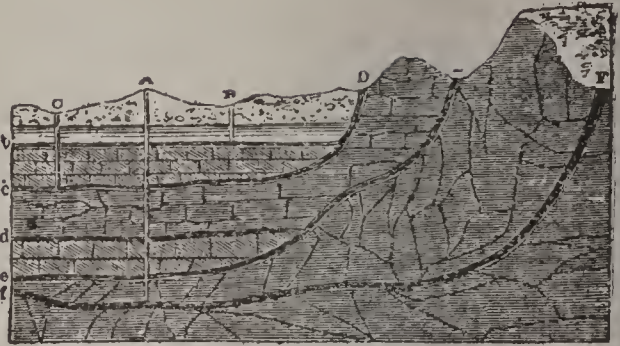
per cent. of bismuth or less, is thought to be an allotropic form of arsenic. *Realgar* (q.v.) is a monosulphide, with 70 per cent. of arsenic (As). *Orpiment* (q.v.) is a trisulphide, with 61 per cent. As. They occur together in the Norris Geyser basin, Yellowstone Park, and in seams in clay under lava, Iron co., Utah. *Dimorphite* ( $\text{As}_4\text{S}_3$ ?) is found at a fumarole near Naples. *Domeykite* is a copper arsenide, As 28·3, found at L. Superior. *Niccolite* is a nickel arsenide, As 56·1; it occurs at Franklin Furnace, N. J., Silver Cliff, Colo., and with *Smaltite* (a cobalt diarsenide, As 71·8) in gneiss at Chatham, Conn. *Gersdorffite*, incrusting on galena and sphalerite at Phoenixville, Penn., is a sulph-arsenide of nickel, nearly half As. *Löllingite*, or *Arsenosiderite*, is an iron-diarsenide, and *Arseniosiderite* (q.v.) is another thing—an arsenic pentoxide compound with iron, lime, and water. *Arsenopyrite* or *Mispickel* is a sulph-arsenide of iron, sometimes cobaltiferous (*Danite*), sometimes nickeliferous; it is nearly half As. *Safflorite* is, like *Smaltite*, a cobalt diarsenide, As 79·3; and *Rammelsbergite* is similar, with nickel instead of cobalt. A cobalt arsenide, nearly four-fifths As, is named *Skutterudite*. There are also tellurium and manganese arsenides described, and *Sartorite* is a lead and arsenic compound with sulphur, while *Epigenite* is a sulphide of this with copper and iron. *Arsenolite*, an As trioxide, has 75·8 per cent. of this element; and another, differing in crystallization, is *Claudetite*. Some lead phosphate (*Pyromorphite*) contains As, and *Haidingerite* is lime arsenate; other arsenates are that of manganese, *Allacite*; a more complex one, *Arsenio-pleite*; and a hydrous ferric one, *Scorodite*. Still other minerals that contain arsenic are *Ecdemite*, *Trippkeite*, *Pitticite*, *Beudanite*, *Atelestite*, etc. Commercial arsenic is derived from ores worked also for nickel, cobalt, etc.

**ARSENICAL SOAP:** important preparation in Taxidermy (q.v.). Its use is not necessary for the thin skins of the smaller birds and smallest mammals, arsenic in dry powder being sufficient; but for thicker skins it is thought to have more penetrating quality.

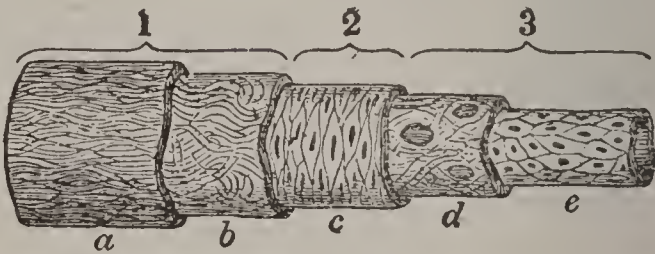
**ARSENIOSIDERITE.** *ár-sën-ĭ-ō-sĭd'ér-īt* [Gr. *arsen'* ikon, arsenic; *sidēros*, iron]: fibrous mineral found in France and Saxony, the large silky fibres radiating in concretions, like caxoxenite, which it resembles also in yellowish color; its composition answers to arsenic pentoxide, with iron and lime. *Arsenosiderite* differs slightly in spelling from *Arseniosiderite*, but much in composition ( $\text{FeAs}_2$ ); it is now named *Löllingite*; and is the same as *Arsenocrocite*. It varies from silver white to steel gray, and has varieties such as *Leucopyrite* ( $\text{Fe}_2\text{As}_4$ ) and others with a little sulphur or cobalt.



Arquebusier of the Seven-  
teenth Century.



**Artesian Well.**—Diagram showing per-  
vious strata in a basin-shaped curve. A, B, C,  
three wells communicating at b, c, d, e, f,  
with underground pervious strata containing  
water which descends by gravitation from  
the higher levels, D, E, F.



**Diagram of the Structure of an Artery.**—1, External coat: a, fibrous, b, elastic; 2, Middle coat: c, muscular; 3, Internal coat: d, elastic, e, endo-  
thelial.



**Arrow-root** (*Maranta arundinacea*): A, Flowering branch: B, Base of  
flower stem; C, Branch of the rhizome.



## ARSENIOUS ACID.

**ARSENIOUS ACID:** the arsenical compound most familiarly known, popularly called Arsenic. It is obtained principally during the roasting of the arsenical nickel ores in Germany in furnaces communicating with flues. When the arsenic of the ore burns, it passes into the condition of A. A. ( $\text{As}_2\text{O}_3$ ), and rising as vapor into the somewhat cool flue, is there deposited as a grayish powder, known by the names of *Smelting-house Smoke*, *Flowers of Arsenic*, *Poison-flour*, or *Rough A. A.* In this condition the A. A. is contaminated with some impurities, from which it may be separated by introducing the gray powder into an egg-shaped vessel, and applying heat at the lower end, when the A. A. rises in vapor and condenses in the cool end as a transparent glassy or vitreous substance. Ordinary A. A. of the shops (which is what is popularly known as *arsenic*) is a white crystalline powder, which feels decidedly gritty, like fine sand, when placed between the teeth, and has no well-marked taste. It is very heavy, so much so as at once to be noticeable when a paper or bottle containing it is lifted by the hand. It is soluble in water to the extent of 1 part of A. A. in about 100 parts of cold water, and 1 part of A. A. in about 10 parts of boiling water. As ordinarily sold in quantities under 10 lbs. in weight, the A. A. is required by the law of some countries to be colored with  $\frac{1}{32}$  of its weight of indigo, or  $\frac{1}{16}$  of its weight of soot, the object of the admixture being to render any liquid to which the A. A. might be added, with a murderous intent, of a black or bluish-black hue, and thus indicate the presence of something unusual. In packages of 10 lbs. and upwards, A. A. is allowed to be sold in the pure white crystalline form without coloration. When placed in a spoon or other vessel, and heated, the A. A. volatilizes, and condenses in crystals on any cool vessel held above. By this means it can be distinguished from ordinary flour, which, when heated, would char, and leave a coal behind; and from chalk, stucco, baking-soda, tooth-powder, and other white substances, which, when heated, remain in the vessel as a non-volatile white residue. Again, when A. A. is placed on a red-hot cinder, and the escaping vapors cautiously brought under the nostrils, the strong alliaceous odor characteristic of arsenic is given off. The mode in which A. A. comports itself when thrown upon water is likewise peculiar. Instead of at once descending through the water like sand, the A. A., notwithstanding its great density (sp. gr. 3.70), partially floats on the surface, as wheat-flour does; and that portion which sinks in the water rolls itself into little round pellets, which are wetted only on the outside, and contain much dry A. A. within. The solution of A. A. in water is recognized by three tests:

1. Hydrosulphuric acid and hydrochloric acid produce a *yellow precipitate* of arsenious sulphide,  $\text{As}_2\text{S}_3$ , which is soluble in ammonia.

2. Ammonio-sulphate of copper, an *apple-green precipitate* of arsenite of copper,  $\text{CuHAsO}_3$ .

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3. Ammonio-nitrate of silver, a *yellow precipitate* of arsenite of silver,  $\text{Ag}_3\text{AsO}_3$ ,

In many cases A. A. is used as a means of destroying animal life, but, happily, the processes for the detection of the poison in organic mixtures and in the animal tissues are so unerring, that it is hardly within the range of possibility that an animal can be destroyed by the administration of A. A. without very decided evidence of the existence of the poison being obtained on examination of the various parts of the animal structure; indeed, it may be safely said that there is no limit to the detection of the poison, as even after the animal structure has been so far decomposed that little remains, yet still the poison, from its indestructibility, survives, and will indicate itself clearly, on the application of the several tests.

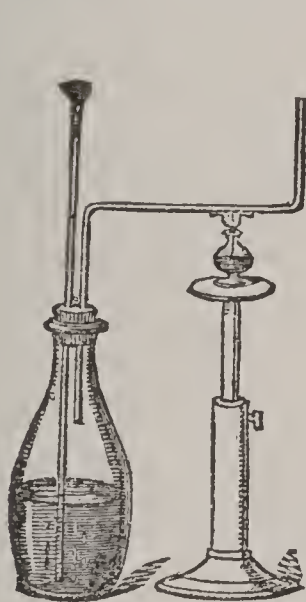
For the isolation and recognition of A. A. in organic mixtures, such as the contents of a stomach, three processes may be followed. The method generally pursued, and that upon which greatest dependence is placed, is called Reinsch's process, from the name of its discoverer. The manner of its application is to treat the organic mixture with water, sufficient to render it thin, then add hydrochloric acid to the extent of one-eighth of the volume of the liquid; apply heat, and when the whole has been raised to near the boiling-point, introduce clean, newly burnished pieces of copper in the form of wire, gauze, or foil. If A. A. be present in the mixture, a steel-gray coating of metallic arsenic will form on the surface of the copper. This apparent tarnishing of the copper may take place when no A. A. is in the mixture, and may be produced by salts of mercury, antimony, etc., as well as by sulphur compounds, and even occasionally by fatty matters. To distinguish between the coating formed by A. A. and that produced by other substances, the copper is taken out of the mixture, washed with water, to remove acid; immersed in ether, to dissolve off any adherent fatty matter; dried between folds of blotting-paper; introduced into the lower end of a dry glass test-tube, and there cautiously heated. The metallic arsenic (As) is driven off by the heat from the surface of the copper, rises in vapor into the upper portions of the test-tube; there meets the oxygen of the air, with which it combines, forming A. A.,  $\text{As}_2\text{O}_3$ , and thereafter deposits itself on the inner surface of the cool part of the tube in little glistening crystals. On allowing the tube to cool, adding water thereto, and applying heat, the water dissolves the crystals of A. A., yielding a solution, to separate portions of which the liquid tests mentioned above may be successfully applied. This process may likewise be employed in the detection of A. A. in animal tissue, as in the liver, spleen, kidneys, etc., by first dividing the animal matter into small pieces, and thereafter treating with water, hydrochloric acid, and copper. The precautions which require to be exercised in trying this process are, that the hydrochloric acid and copper are themselves free from A. A. Hydrochloric acid has long been known to be liable to contain at times a very



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sensible proportion of the poison, and it is therefore necessary, before using the acid in any experiment, to make a preliminary trial with dilute hydrochloric acid, into which when heated a piece of copper is immersed; and if no tarnishing occurs after a quarter of an hour's trial, the acid may be declared free from contamination with arsenical compounds. The liability of copper to contain arsenic assumed importance in connection with a trial in Britain, 1859, Aug., for murder by slow poisoning with arsenic. In this case a considerable amount of copper was dissolved during the testing, and supplied the poison in quantity enough to produce a faint coating on a piece of copper which was subsequently introduced into the liquid. The result was, that A. A. was at first declared to be present in the material under examination; but further experiments demonstrated that the copper itself had afforded the arsenic. To free copper from any arsenic which it may contain originally, it is only necessary to heat the copper over a gas or spirit-lamp flame, when the arsenic volatilizes, and leaves the copper uncontaminated therewith.

The other two processes for the detection of A. A. in organic mixtures are—1. That recommended by Marsh, in which the material is treated with dilute sulphuric acid and metallic zinc in a gas-generating apparatus, when the arsenic,



Marsh's process.



Berzelius's process.

combining with hydrogen, forms arseniuretted hydrogen  $\text{AsH}_3$ , from which, in the act of escaping, the metallic arsenic, and subsequently A. A., can be obtained; 2. That known as Berzelius's process, in which dry arsenical compounds are mixed with a reducing flux, and heated in a constricted tube, when the metal arsenic is produced, which in its turn is converted into A. A. by heating in a wide test-tube. The processes of Marsh and Berzelius are not so generally followed as that of Reinsch; but in each and all it is absolutely necessary, in order to avoid the possibility of mistake, (1) that metallic arsenic be obtained from the organic

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mixture; (2) that the metallic arsenic be converted into A. A.; and (3) that this A. A., treated with water, should yield a solution which will give the three liquid tests mentioned previously.

A. A. forms compounds (salts) with alkalies and other bases, which are called Arsenites. Some of these are employed in commerce and medicine. A. A., boiled with a solution of potash, or carbonate of potash, forms an arsenite of potash, used in medicine, known as *Fowler's Solution*. The more largely used sheep-dipping mixtures are composed of A. A., soda, sulphur, and soap, which, when used, are dissolved in a large quantity of water, and thus constitute essentially dilute solutions of arsenite of soda. A compound of A. A. and the oxide of copper, called the arsenite of copper, or *Scheele's Green*, is a pigment largely used by painters as a pretty and cheap green paint. The same substance is extensively employed in the manufacture of common green paper-hangings for the walls of rooms; and recent investigations show that rooms covered with paper coated with this green arsenite of copper are detrimental to the health of occupants, from the readiness with which minute particles of the poisonous pigment are detached from the walls by the slightest friction, are diffused through the room, and ultimately pass into the animal system. Another green pigment is named *Schweinfurth Green*, and contains A. A., oxide of copper, and acetic acid, and is a double arsenite and acetate of copper.

ARSENIC (ARSENIOUS ACID), *Properties of, as a Drug*.—A. has long been used as a medicine. When taken into the stomach, it is soon absorbed into the blood, and circulates with that fluid, exhibiting great power over certain diseases, especially skin diseases, as psoriasis, lepra, eczema (q.v.), etc. It is classed among the tonic minerals, and given for nervous disorders, especially those that are periodic. Of late it has been much recommended for rheumatism; and Dr. Begbie, of Edinburgh, considered that among the remedies for chorea (St. Vitus' dance) it holds the foremost place. In ague, also, and remittent fever, as well as in other disorders originating from the same source, A. and quinine are chief remedies. They are considered to act as alteratives of the blood. The usual method of administering A. is in small doses (from three to five drops) of the liquor arsenicalis, largely diluted with water, twice or thrice in the day. Arsenic is sometimes given combined with iodine and mercury (Donovan's solution).

When given in the doses above mentioned, for eight or ten days, symptoms of poisoning begin to appear; the skin becomes hot, the pulse quick, the eyelids hot and itchy; the tongue has a silvery appearance; the throat is dry and sore, the gums swollen and tender; and if the treatment is persisted in, salivation ensues, and then come nausea, vomiting, diarrhea, nervous depression, and faintness (Begbie). The quantity necessary to destroy life, of course, varies. Dr. Christison records the case of a man who died in six days, after taking thirty grains of the powdered white A.; but a much smaller dose will prove fatal; a girl was



killed with two grains and a half of A. contained in two ounces of fly-water. According to Dr. Swaine Taylor, a medical witness is justified in stating, that under circumstances favorable for its operation the fatal dose for an adult is from *two to three grains*. Death from a poisonous dose of A. may occur in a few hours, or after the lapse of days. A woman, aged 56, used a solution of A. in water to cure the itch; she experienced severe suffering, and died after two years, having had symptoms of arsenical poisoning all that time.

A. has been used frequently as a slow poison, the symptoms being attributed to inflammation of the bowels from natural causes. Fortunately, in most cases its detection is easy. Orfila found A. in the soil of cemeteries, a fact which has created some discussion among toxicologists. A. is used by anatomists as an antiseptic, but is dangerous, as it is apt to get into cuts on the hands, and under the finger-nails, and cause disagreeable symptoms. In Styria, A. is taken by the peasant girls to increase their personal attractions; and it has been ascertained that in other Austrian provinces, A.-eating is largely practiced by men, who nevertheless attain old age—an instance of the tolerance which can gradually be set up against dangerous poison. These ignorant A.-eaters, who generally begin the use of the drug secretly, claim that it improves the complexion, and so strengthens the respiratory organs as to enable bearers of heavy burdens to climb mountains with ease. When the habit is established it cannot be given up; and sudden cessation causes death.

No effective chemical *antidote* for A. has yet been discovered. In case of an overdose or of intentional poisoning, the following treatment is recommended: Evacuate the stomach by the stomach-pump, using lime-water; administer large draughts of tepid sugar and water, chalk and water, or lime-water; avoid the use of alkalies, but administer charcoal and hydrated sesquioxide of iron; take a tepid bath, and use narcotics. If the fatal symptoms be averted, let the patient for a long time subsist wholly on farinaceous food, milk, and demulcents.

ARSENOCROCITE: see ARSENOSIDERITE.

ARS-FOOT, *ârs'foot*: English name for the Great-crested Grebe (*Podiceps cristatus*). SMALL A., the Little Grebe (*Podiceps minor*).

ARSINOE, *ar-sîn'ô-ê*: b. abt. B. C. 316: daughter of Ptolemy I. king of Egypt, and of Berenice. She was married in her sixteenth year to the aged Lysimachus, king of Thrace, whose eldest son, Agathocles, had already wedded Lysandra, the half-sister of A. Desirous of securing the throne for her own children, A. prevailed on her husband to put Agathocles to death; the consequences of which crime, however, were fatal to the Thracian monarch; for Lysandra, having fled with her children to Seleucus in Asia, managed to induce him to declare war against her unnatural father-in-law. Lysimachus was slain, and Seleucus seized the kingdom. A. now sought

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refuge in Macedonia, which, however, was also taken possession of by Seleucus; but on the assassination of the latter, after a few months, by Ptolemy Ceraunus, the half-brother of A., she received a hypocritical offer of marriage from Ptolemy, who wanted to destroy her two sons, lest they should prove formidable rivals to his ambition. She consented to the union, and opened the gates of the town in which she had taken refuge, but her children were butchered before her eyes. She then fled to Egypt (B. c. 279), where she married her own brother, Ptolemy II. Philadelphus. These unnatural unions subsequently became common among the Greek kings of Egypt. It does not appear that A. had any children by her brother, though she was regarded by him with great affection. He named several cities, and also an entire district, by her name. After her death, he ordered Dinochares, the architect, to build a temple to her memory, and roof the edifice with loadstones, so that her iron statue might seem to float in the air.

ARSIS, n. *ár'sis* [Gr. *arsis*, the rise of the voice in a syllable—from *airo*. I raise]: in *poetry*, the accented syllable of a foot, or that on which the stress of the voice is put, the other part of the foot being called the *thesis*; in *music*, applied to the rising and falling of the hand in beating time. It is also applied to the elevation and depression of the voice in speaking.

ARSON, n. *ár'sŏn* [F. *arson*; mid. L. *arsŏnem*, a burning—from L. *arsus*, burnt]: the crime of wilfully setting on fire property. A. (called in Scotland *wilful fire-raising*), is, according to the laws of all civilized countries, a crime of the deepest atrocity; for it involves not only destruction of property, but also destruction of, or at least indifference to, the life of others. In the criminal law it is a felony, and has been described in England and some states of the Union as the malicious and wilful burning of the house or building of another man: in some of the states (New York, etc.), it is the setting on fire of any building—even one's own house—which contains a human being, or of any outbuilding whose burning will manifestly endanger such a building. To constitute such felony, there must be an *actual* burning—some wasting of fibre by combustion; for intent, however clear, would not suffice at common law to support a charge of A. The extinguishment of the fire does not bar the charge. Some states declare it to be A. to set fire with intent to defraud an insurance company. In general, U. S. law does not apply the term A. in the case of as many kinds of property as the English law.

ART, v. *árt* [Icel. *ert*: AS. *eart*: Dan. *er* (see ARE)]: the 2d sing. of the pres. tense of verb *be*.



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ART, n. *ârt* [F. *art*, art—from L. *artem*, an art]: the rules and method of doing a thing well; anything done by human skill—the opposite of *nature*; knowledge applied to the uses of every-day life—the opposite of *science*; a trade; skill; cunning. ARTS, n. plu. a mediæval term used to designate certain articles or subjects of study; a modern art course is 'Latin, Greek, mathematics, moral philosophy, logic, rhetoric, and natural history,' but the subjects vary in different universities. ART AND PART, a share in contrivance and execution. ARTFUL, a. *ârt'fool*, cunning; crafty. ARTFULLY, ad. *-lî*, with art or cunning; skilfully. ARTLESS, a. unskilful; natural; simple. ARTLESSLY, ad. *-lî*. ARTLESSNESS, n. ARTFULNESS, n. skill; cunning. ARTIFICE, n. *âr-tî-fîs* [F. *artifice*—from L. *faciō*, I make]: a trick; an ingenious contrivance, in a good or bad sense. ARTIFICER, n. *âr-tîf'î-sér*, a workman; a contriver. ARTIFICIAL, a. *âr'tî-fîsh'ûl*, made by art; not produced by nature; feigned; fictitious. ARTIFICIALLY, ad. *-lî*. ARTIFICIALNESS, n. the quality of being artificial. ARTIFICIALITY, n. *âr'tî-fîsh'î-ûl'î-tî*, appearance or result of art. ART UNION, *-ûn'yûn*, a subscription lottery of paintings, engravings, etc. ARTISAN, n. *âr'tî-zân* [F. *artisan*]: a workman; a mechanic. FINE ARTS, *fîn'ârts*, those productions of human skill and genius more immediately addressed to the taste, or to the imagination—such as painting, sculpture, engraving, music, etc. MASTER OF ARTS, in *mediæval times*, one declared qualified to teach students in arts, as *Doctor* was one declared qualified to teach students in theology or in law. DEGREES IN ARTS, academic titles conferred on persons after a certain university course of study, and a strict examination in the subjects of that course, the lower degree being Bachelor of Arts [B.A. or A.B.], and the higher, Master of Arts [M.A. or A.M.].—SYN. of 'art': knowledge; learning; crudition; literature; science; skill; readiness; adroitness; dexterity; trade; business; profession; contrivance; calling; artifice; cunning; deceit; tact;—of 'artful': cunning; deceitful; adroit; crafty; dexterous; skilful; designing; artificial; fictitious;—of 'artificer': artisan; artist; mechanic;—of 'artifice': trick; finesse; stratagem; subterfuge;—of 'artless': unaffected; sincere; candid; guileless; frank; open; simple; undesigning.

ART, in the sense of FINE ART: a production (or the science or practice of such production) of human skill or genius more immediately addressed to the taste or imagination; distinguished from the useful arts, or the industrial operations for supplying the common necessities of life. Painting and Poetry are fine arts; Agriculture, Navigation, and Medicine are useful arts.

Omitting here the profound impulse of A., a soul-striving after the perfect, we consider it only as pleasurable. Many enjoyments no artist would think of attempting to provide. The gratifications of eating and drinking, of exercise and repose, warmth and coolness, form a class in contrast with the pleasures of music, sculpture, or the drama. It is a matter of nicety to draw the line between

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these two regions of pleasurable susceptibility; indeed, a precise line is not drawn. Certain peculiarities can be assigned as disqualifying circumstances, such that any mode of pleasure laboring under them is debarred from entering into A.; but after these are allowed for, there will remain a disputed border-land, on which no general criterion will hold.

The various indulgences called sensual are examples both of original contrast, and of possible blending by ideal presentation, with the pleasures of A. In the first place, as man's frame is constituted, these bodily functions, while incidentally ministering to his pleasure, are in the main subservient to maintaining his existence, and being in the first instance guided for that special end, they do not necessarily rank among gratifications as such; in the second place, they are connected with the production of what is repulsive and loathsome, which mars their purity as sources of pleasure; and in the third place, they are essentially confined in their influence to the single individual; for the sociability of the table is an element superadded. Now, a mode of pleasure subject to one or more of these three conditions may belong in an eminent degree to the list of utilities, and constitute an end of industry, but does not come under the class now considered. Wealth is disqualified by the third condition, inasmuch as, while in the shape of money, it is confined to some single proprietor. The same may be said of the pleasures of Power and Dignity. Even Affection is too exclusive to come under the artistic head. Anything so restricted in its sphere of action as to constitute exclusive individual property, and give occasion to envy and jealousy, is not a pleasure aimed at by the producer of Fine A.; for there do exist objects that can give delight as their primary end, that have no disagreeable or revolting accompaniments, and whose enjoyment is not restricted to a single mind; all which considerations obviously elevate the rank of such objects in the scale of human enjoyments. The landscape, the glowing sunset, the song of the lark, the flowers of the field and the garden, yield unalloyed pleasure, and create no monopoly. The painter, sculptor, and musician aim at corresponding effects.

The eye and the ear are the chief avenues of artistic delight; the other senses are more or less in the monopolist interest. Moreover, one important feature in the somewhat capricious attribute termed *refinement* attaches more particularly to the objects of these two senses; namely, the power of protracted enjoyment without fatigue. A *coarse* effect is one that is intense and pungent, but too exhausting to be kept up; such is a noisy clash of loud instruments in a musical performance, or a tale of overdone marvels. To remove all the fatiguing accompaniments, and thereby tone down the exciting influence, while retaining as much as possible the really pleasurable part, is to refine upon the effect, and produce a higher work of art. Now, in the sensations of taste and smell generally, the stimulus is apt to be of short duration, the pleasure is said



to pall soon. Yet there are degrees in the case; some of the choicer odors can for hours together produce a gentle and pleasing sensation. But it is the ear, and perhaps still more the eye, that can remain open to agreeable stimulation for the greatest length of time; and in this fact, with the unconsuming nature of their objects, the artist finds good reasons for striving earnestly towards the gratification of those two senses.

The sensual elements can be brought into A. by being contemplated in the *idea*, in place of being enjoyed in the reality. A painter or poet may depict to the mind a feast, and impart a pleasure that differs essentially from the delights of eating and drinking. The imagined repast has nothing to do with present bodily necessities; the disagreeable accompaniments can be kept out of view; and any number of persons may share in the effect. So with the elements of wealth, power, dignity, and affection, which in their actuality lack the liberal character of the true artistic delight; when pleasure can be derived from the spectacle of them in the hands of the select number of their possessors—pleasure apart from a rising of selfish desire—then they become an enjoyment that can be shared by the general multitude, like the blue sky or the towering peak. It is the fact that mankind find a charm in contemplating the wealthy, the powerful, the elevated, the illustrious, the beloved; and accordingly such elements are freely adopted into artistic compositions.

If all the sensual gratifications could become artistic by being contemplated in idea, or merely thought of, as in the above case of imagining a rich feast, aside from the rising of desire, there would exist the means of distinctly circumscribing the select region of the beautiful or artistic, and of resolving a difficult problem. It would be admissible for the poet or painter to suggest any of those inferior pleasures to the mind by descriptive touches, and he would thereby elevate them into the region of art. But it is found that every mode of sensual gratification is not open to this merely ideal presentation, since the ideal is instantly seized as the vehicle for desire, and so becomes subjected and practically effaced in the sensual. Even as regards eating and drinking, exception is taken against the too free allusion to those pleasures; while the sensuality of love is hardly to be suggested through the most distant allusion. The reader may revel in tales of mere tender emotion—of parental love and of pure affection—but those other subjects are kept at the utmost distance; and he would be said to be revelling in sensuality, if he were merely to indulge in the imagination of those species of delight. There is, therefore, no other course but to recognize that there are limitations which, whether original in man's nature or not, have become established among his actual and continuing relations—limitations of the sphere of the artist, rendering it quite impossible, at the present stage of man's development, to draw any clear and universal boundary-line between the beautiful and agreeable generally.

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Sublimity, Beauty, Grace, Harmony, Melody, Pathos, Ideality, Picturesqueness, Proportion, Order, Fitness, Keeping, and the Ludicrous—though they do not all relate to the so-called *beautiful*, are all involved in the circle of pleasure now under consideration; and it is obvious that no one fact can run through this variety of designations. There must be a great multitude of agents operating to produce these different impressions, which are related to one another only by attaching in common to the æsthetic class of compositions. Doubtless, several of these names may be employed to mean the same thing, being, in fact, partially synonymous terms; as Beauty and Grace—Proportion, Fitness, and Keeping; but hardly any two terms are synonymous throughout, and there are distinct conceptions implied in Sublimity, Beauty, Picturesqueness, Fitness, and the Ludicrous.

Among the elementary sensations and emotions of the human mind that are of a pleasurable kind, a certain number may enter at once into the composition of A.; such are the pleasures of sound and sight, the emotion of surprise, and plot-interest. Others may enter by ideal presentation; as the gratifications of the remaining senses, and the emotions of fear, tenderness, irascibility, power. The feelings more specific to A. are those produced by Harmony under its various aspects. When sweet sounds are harmoniously combined, we have the musical art; the painter has a similar aim in reference to colors and forms; and so through all the Fine Arts this quality is found recurring as the crowning work of the artistic hand. Nothing is so indisputably included within the circle of the æsthetical or beautiful as finely struck harmonies, melodies, or concords. Whatever else may be included in a composition, it is the admission of these that gives the specific charm, although it would be a mistake to dispense with other elements of interest common to art and to every-day life. Story is essential to Romance and Poetry; sweetness in the separate sounds is requisite for good Music; and color in itself imparts æsthetic pleasure apart from harmonious union.

The agreeable effect designated by Fitness takes rank with the artistic pleasures; we may call it the æsthetic of the useful. When a work is not only done effectually, but done with the appearance of ease, or the total absence of restraint, difficulty, and pain, a delight is experienced quite different from the satisfaction growing out of the end attained. Much of the pleasure of architectural support is referable to this source.

Among the susceptibilities touched by artistic arrangements is the sense of Unity in multitude, arising when a great number of things are brought under a comprehensive design, as when a row of pillars is crowned by a pediment. The use of simple figures—the triangle, circle, square, etc.—for inclosing and arranging a host of individuals, has the tendency to make an easily apprehended whole out of a numerous host of particulars. In all large works abounding in detail, the mind craves some such compre-



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hensive plan, whereby to retain the total, while surveying the parts. A building, an oratorio, a poem, a history, a dissertation, a speech, should have a discernible principle of order throughout, the discernment of which gives an artistic pleasure, even in works of pure utility.

The craving for Variety and Novelty is a powerful impulse of the human mind, and makes itself especially apparent in the appreciation of works of A. The greatest works cease to please after a time, and temporary fashion may occasionally lord it over the perennial in taste.

The Fine Arts, individually considered, may be divided into two classes, by drawing a distinction of some importance as regards the question of an artistic *standard*. One class contains the *effusive* arts, or those which consist of mere outbursts of the inward spontaneity, regulated by the effect of the display on the sense of the beholder or listener. Music is a good example. The spontaneous effusions of the human voice, and those prompted by the various emotions, are corrected and tuned by the ear into melody and harmony, and after this process has been often repeated, pleasing airs and compositions are the result. It is the same with the Dance, considered as a fine art. In like manner, dramatic gesture and display, and the graces of elocution and fine address, are the natural promptings rendered pleasing by being changed and modified for that express end. The first movements are mere random, but the delicate sensibility of the beholder causes some to be suppressed, and others brought out, until a really pleasing combination is attained. Contrasted with the purely effusive are the so-called *imitative* arts, or those that involve the representation of some of the appearances of the outer world. Such are Painting, Sculpture, and Poetry. In these, the artist, while still aiming at pleasing effects, is trammelled with a new condition—namely, a certain amount of fidelity to his original. In the others, there are no originals, other than those whose existence is only that of natural ideals of harmony in the mind. The musician imitates nothing; and is bound by the sole condition of gratifying the ear; but a painter chooses his subject from nature, and although he must contrive to yield the pleasures of color, outline, and grouping, he must do so with a certain respect to the object copied. The poet, in depicting the life of men, comes under the rule of fidelity to this extent, that an obvious misrepresentation is apt to give a painful shock, and mar the pleasure that would otherwise be derived from the poetry itself. It is not so much that truth is a part of the artist's pleasure, as that falsehood is a stumbling-block in the way; for even the imitative arts are so only in part. There is no imitation in the metre and cadence of a song, yet these often constitute its main charm. So a certain license of fantastic effusion is allowed to poets, subject to no rules but the giving of pleasure. The creation of imaginary worlds, when avowed, is not objected to; and the criterion of fidelity to the actual is accordingly laid aside for the time. The various arts of Decoration and Design are for the most part effusive,

although occasionally imitative. Architecture is not in any way imitative; the coincidence between the gothic roof and the intermingling foliage of a double row of trees is mere accident.

These observations are necessary in order to qualify the current maxim, that Nature (as known in actual operation) is the artist's standard, and Truth (as developed in facts) his chief end; conditions that, in their strictness, apply only to science, and to science in its more outward domain as physical. It is the scientific man that should never deviate from nature, and should care for truth above every other consideration. The artist's standard is *feeling*, his end the refined ideal; he may go to nature, as known in operation, but it is to select what chimes in with his feelings of artistic effect, and pass by the rest. He is not bound to adhere to what nature shows him even in her choicest displays; his own taste being the touchstone, he alters the originals at his will: he has right to claim knowledge of a higher 'nature' than is yet visible to him. The student of physical science, on the other hand, must embrace every fact with open arms. If a nauseous fungus or loathsome reptile meet the eye of a naturalist, he is bound to record it as faithfully and minutely as he would dilate on the violet or the nightingale. When a painter adopts the human figure as a basis for setting forth harmonies of color, beauties, and form, and picturesqueness of grouping, he ought not to jar the universal sense of consistency by a wide departure from the usual proportions of humanity. Still, the observers do not look for anatomical exactness; they know that the studies of an artist do not imply the knowledge of a professor of anatomy; but they expect the main features of the reality to be adhered to. In like manner, a poet is not great because he exhibits human nature with literal fidelity to its actual development in operation; to do that makes the reputation of a historian or mental philosopher. The poet works by his metres, his cadences, his touching similes, his graceful narrative, and his exaltation of reality into the region of ideality, and if in all this he avoids serious mistakes and gross exaggerations, he succeeds in his real vocation, which is to give glimpses of a possible nature of a grade higher than has yet been reached in the actual. It is imperative, however, that he keep his grand ideal within limits where it can be identified as still one with the natural.

The attempt to reconcile the artistic with the true (or actual)—art with nature as known—has given birth to a peculiar school, in whose productions a restraint is put upon the flights of pure imagination, and which claims the merit of informing the mind as to the realities of the world, while gratifying the various emotions of taste. Instead of the tales of Fairyland, the Arabian Nights, and the Romances of Chivalry, we have the modern novelist, with his pictures of living men and manners. In painting, we have natural scenery, buildings, men, and animals represented with scrupulous exactness. The sculptor and the painter exercise the vocation of producing portraits



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that shall hand down to future ages the precise lineaments of the men and women of their generation; hence, the study of nature has become an element in artistic education; and the artist often speaks as if the exhibition of facts were his leading purpose. It is probably this endeavor to subject the imagination more strictly to the conditions of visible reality, that has caused the singular inversion whereby the definition of science is made the definition of art.

But while fidelity, in the imitative class of arts, is to be looked upon, in the first instance, as avoiding a stumbling-block rather than constituting a charm, there are still certain ways wherein we derive from it a sort of pleasure that may be called æsthetic. We feel drawn by fellow-feeling towards one who has attended to the same objects as ourselves, or who has seized and put into vivid prominence what we have felt, without ever having expressed. The coincidence of mind with mind is always productive of the agreeable effect of mutual sympathy, and, in some circumstances, there is an additional effect of pleasing surprise. Thus, when an artist not merely produces in his picture those features of the original that strike every one, but includes all the minuter objects that escape the notice of the generality, we sympathize with his attention, we admire his powers of observation, and become, as it were, his pupils, in extending our study and knowledge of nature and life. We feel a pungent surprise at discovering, for the first time, what has been long before our eyes; and so the minute school of artists labor at this species of effects. Moreover, we are brought forward as judges of the execution of a distinct purpose; we have to see whether he that is bent on imitation does his work well or ill; and if our verdict is favorable, our admiration is excited accordingly. There is, too, a certain exciting effect in the reproduction of some appearance in a foreign material, as when a plain surface is made to yield the impression of solid effect, and canvas or stone imitates living humanity. Finally, the sentiment of reality, as opposed to fiction or falsehood, appealing to our practical urgencies, disposes us to assign a value to every work in which reality is strongly aimed at, and to derive an additional satisfaction when fidelity of rendering is induced upon the charms peculiar to A. Thus imitation—which, properly speaking, is a mere accident attaching to Sculpture, Painting, and Poetry, and has no place in Music or Architecture—may become the centre of a small group of agreeable or acceptable effects. These effects are the more prized, because we have been surfeited with the purely æsthetic ideals. We turn refreshed from the middle-age romance to the graphic novel of our own time.

Besides being a source of pleasure, art is frequently spoken of as having an elevating and refining influence on the mind and character; for which reason it is considered a proper object of public encouragement in civilized communities. This elevating influence is owing to the higher nature of artistic pleasure as above described,

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the taste for which helps to rescue mankind from the exclusive dominion of sensual and selfish enjoyments. This beneficent influence has not been realized when art has been degraded to the service of the sensual. Further, it must be admitted that the devotion to art may be itself excessive, and have the effect of withdrawing men too much from the urgency of practical life, rendering them a prey to political despotism, as well as indifferent to moral principle.

See *ÆSTHETICS*: also the authors named in that article. See also Bain on the *Emotions and the Will*; Herbert Spencer; Ruskin; Lotze; Schasler.

**ART, HISTORY OF:** a portion of the history of civilization. As regards each particular people, the history of their efforts to conceive and express absolute perfection, or what is commonly called ideal beauty, in form and color, is one of the chief tests of the stage of progress which they have attained. Nor is it as an indication of their command over physical nature, of the abundance of their external resources, or even of their intellectual activity alone, that the history of the art of a people is thus important. It exhibits their moral and even, in a certain sense, their religious position, for the inseparable connection between the beautiful and the good is in no way more clearly manifested than in the fact that the first inroads of demoralization and social disorder are invariably indicated by a diminution in the strength and purity of artistic forms. It has been usual to include under the term history of art the history of the arts of form only, including architecture, but excluding poetry and music, though these latter are generally included when we speak of the fine arts. See **ART**.

The classical nations of antiquity were not insensible to the importance of tracing the development of that rich artistic life which they had originated, and we accordingly find the germs of artistic history in Pliny, Quintilian, Pausanias, and others. In the middle ages, every trace of a general historical treatment of art disappears, though casual remarks and incidental notices on the subject of artists and the arts are abundant, particularly in such works as the *Liber Pontificalis* of Abbot Anastasius, commonly known as 'the Librarian,' in consequence of his having filled that office at the Vatican in the 9th century. But a history of art, in the sense which we have here assigned to the term, made its appearance in the world for the first time on the revival of letters, in the 15th and 16th centuries; when the artistic treasures of the heathen world, which had come upon mankind as novelties, were brought into contrast with that peculiar type which art had assumed under Christian influences during the middle ages, on the one hand (see **BYZANTINE ART**), and on the other with that rich harvest of fresh invention which ripened during the long lives of Leonardo da Vinci (q.v.) and Michael Angelo (q.v.), in the period of which Raphael's (q.v.) short career may be regarded as the noon-day. While Vasari (q.v.) traced the great epochs of Italian art from



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only a biographical point of view in his celebrated work, the students of classical literature collected such expressions of opinion on artistic subjects as the writings of the ancients contained, and Palladio, Ligorio, Vignola, and others measured ancient buildings and their constituent members. In this way a vast mass of information on artistic subjects was brought together. But though the materials which might have served for a history of art were thus supplied, it was long afterwards that any proper historical treatment arose; and the knowledge of ancient art which had been gained was applied to their respective purposes by artists on the one hand and philologists on the other. As regarded modern art, the biographical method of Vasari was adhered to, and to this circumstance we are indebted for the innumerable artistic anecdotes which have been preserved. The remarkable variations in style which exhibited themselves between the 16th and 18th centuries gave rise to a species of historical treatment which had for its object the discovery of the common features by which the artists of the respective periods were distinguished. But the history of style, strictly speaking, begins with Winckelmann (q.v.), who was the first to divide ancient art into epochs, and to trace its connection with the general history of human progress. It was from this period that the history of art came to be regarded as a branch of the history of civilization. Even where the biographical method continued to be followed, it was henceforth with this difference, that the division into schools took the place of mere chronological arrangement. The strongly classical tendency which exhibited itself towards the end of the last century, and the romantic reaction and consequent admiration for the middle age which succeeded, though both must be regarded as one-sided influences, had an unquestionable effect in calling attention to what was really great in the artistic productions of these respective periods; and during the present century, the history of art has gradually assumed a more important place as a department of general history. In only very recent times, however, has a complete artistic history appeared in Kugler's *Handbook of the History of Art*, partially translated into English, and edited by Sir Charles Eastlake. In the original work, which is excellent, the immense mass of material that the subject offered has been arranged in periods, and treated in such a manner as to present a sketch complete in itself, while its connection with and dependence on general history, social, political, and philosophical, are carefully indicated throughout. With Kugler's history, that of Sehnäase is to be mentioned—a work giving a philosophical and historical account of the origin of the various styles, and their connection with each other; as also the works of Lübke, Springer, and Carrière. Kinkel's history of Christian art has unhappily remained incomplete. Waagen, Passavant, Reumont are well-known authors. There are many other historical works of importance on special departments and separate schools of art, monographs such as

## ARTA—ARTABOTRYS.

Stirling-Maxwell's *Annals of the Artists of Spain*, and *Velasquez and his Works*; Ruskin's *Modern Painters*; Crowe and Cavalcaselle's *Hist. of Painting in Italy*, and their *Raphael*; Mignaty's *Le Corrège*; Murray's *History of Greek Sculpture*. See PAINTING: SCULPTURE.

ARTA, *âr'tâ*, or NAR'DA, ancient *Ambracia*: a town in Epirus, ceded by Turkey to Greece, 1881: on the w. line of the new frontier, about 7 m. from the gulf to which it gives name, and 39 m. s. from Janina. It is on the left bank of the river Arta, the ancient *Aracthus*. It is the see of a Greek bishop; has a considerable trade and manufactures, chiefly of cloths and leather; but suffers greatly from malaria. The town has never recovered from the disasters of 1828, when it was stormed by the Greek patriots under Marco Botzaris. Portions of the old walls and foundations of the Acropolis are the only relics of Hellenic times. Remains of the lower empire exist in a convent founded 845 by the empress Theodosia. Pop. (1893) 4,535, two-thirds Greeks.

The ancient city of Ambracia, founded by a Corinthian colony about B.C. 635, was at one time a flourishing independent state, with a considerable territory. It was ruined by the Amphilochians, and became subject to Philip of Macedon. Pyrrhus made it the capital of Epirus; afterwards it fell into the hands of the Ætolians, and then of the Romans.

AR'TA, GULF OF: an arm of the Ionian Sea, 25 m. long and 10 wide, between Greece and Turkey. Until 1881 the whole of the n. coast was Turkish; but in that year the portion e. of the river Arta was ceded to Greece. It was arranged that the gulf should be neutral, the fortress commanding the entrance to the gulf on either side being disarmed. Under its ancient name of the Ambraciot Gulf, it separated Epirus and Acarnania.

ARTABAZUS, *âr'tă-bă'zûs*: name of several distinguished Persians in the times of the Achæmenidæ. When Xerxes advanced against Greece, one commander named A. led the Parthians and Chorasini. At a later period he warned Mardonius, but in vain, against engaging in battle at Plataea; and on the first indications of defeat, he withdrew his own division, amounting to 40,000 men, from the field, and succeeded, though with great difficulty, in forcing his way through the wilds of Thessaly, Macedonia, and Thrace to Byzantium, where he crossed to Asia. Subsequently, he acted as negotiator between the Spartan Pausanias and Xerxes.

Another ARTABAZUS was general under the Persian king, Artaxerxes Mnemon, and revolted against Artaxerxes Ochus B.C. 356. For this offense he appears to have been forgiven: and subsequently we find him accompanying King Darius after the battle of Arbela. Alexander rewarded his fidelity by appointing him satrap of Bactria.

ARTABOTRYS, *âr-tă-bō'trîs* [Gr. *artaō*, to fasten; *botrus*, a cluster of grapes—so called because it possesses



## ARTAGUETTE-ARTAXERXES.

tendrils]: genus of plants belonging to the order *Anonaceæ*. *A. odoratissima*, or Sweet-scented A., is a beautiful Chinese plant, which makes a fine covering for walls.

**ARTAGUETTE**, *âr-tâ-gèt'*: d. 1736; b. France: soldier. He accompanied Bienville, the colonial French gov. of La., to America, and was employed in subjugating the Indians. His success in overcoming the great Natchez tribes was rewarded with the command of the Ill. and Wabash regions. When Bienville determined to punish the Chickasaw tribe for joining English traders and interfering with the commercial interests of the French on the Mississippi river, he gave A. command of an expedition consisting of 50 French troops and more than 1,000 friendly Indians. In 1736, June, A. descended the Mississippi river with his Indians, and when within striking distance of the Chickasaw stronghold, established a concealed camp, and awaited the arrival of the troops from New Orleans. For some cause the troops did not appear, and he reluctantly ordered an attack on the Chickasaws, doubting his ability to longer restrain his allies. His Indians captured two strongholds, and in attacking the third A. was twice wounded, and when he fell his followers fled, excepting a Jesuit priest who remained to dress his wounds. After the retreat, the Chickasaws burned A., the priest, and their other prisoners at the stake.

**ARTANTHE**: see **MATICO**.

**ARTAXA**, *âr-tâks'a*, or **ARTAXIAS**, *âr-tâks'î-as*: name of three kings of Armenia. A. I. was a gen. under Antiochus the Great, and when the latter was defeated by the Romans made himself independent in Armenia and founded the kingdom, B.C. 190. A. II. was chosen king after his father had been dethroned and taken by Mark Antony to Alexandria B.C. 34; was expelled by the Romans; reinstated by Phraates IV. of Parthia; and murdered by his nobles for his cruelty. A. III., whose original name was Zeno, was a son of the king of Pontus, and was placed on the throne by the Romans A.D. 18.

**ARTAXATA**, *âr-tâks-â'tâ*: strongly fortified city in Upper Armenia, said to have been built by Annibal for King Artaxias. It was burned by Corbulo; rebuilt by Tiridates, who renamed it Neronea, in honor of Nero; and was afterward known as Ardesch.

**ARTAXERXES**, *âr'tâks-érks'êz*: the name of several kings. A. I., surnamed *Longimanus*, second son of Xerxes, escaped from the conspiracy of Artaban and others, and ascended the throne B.C. 465. His long reign, extending to 425, was marked by a decline of power.

**ARTAXERXES II.**, surnamed *Mnemon*, succeeded his father, Darius II., B.C. 405. After gaining the victory over his brother Cyrus, he became involved in war with Sparta, which ended with the Antalcidean Treaty of Peace: he d. 361.

**ARTAXERXES III.** surnamed *Ochus*, son and successor of A. II., reigned in the true style of oriental despotism until B.C. 338. One of his most daring exploits was in

## ARTANTHE—ARTEDI.

Egypt, where he caused the divine bull Apis to be slaughtered and cooked as ordinary beef. A. III. was poisoned, 338, by his eunuch Bagoas. It is said that his flesh was eaten by cats, and that hilts for scimitars were made of his bones.

The founder of the new Persian dynasty, or the Sassanidæ (which ruled A.D. 226-651), was named Artaxerxes.

ARTEAGA, *âr-tā-â'gâ*, ESTEBAN: d. 1799; b. Madrid: historian. He was educated for a Jesuit priest, and was engaged in missionary and educational work in Spain till the suppression of his order, when he removed to Italy. His best-known publication is a history of the Italian lyrical drama, *Le Rivoluzioni del Teatro Musicale Italiano*, 2 vols. (Bologna 1783).

ARTEAGA, JOSÉ MARÍA: about 1830-1865, Oct. 21; b. Aguas Calientes, Mexico: soldier. Born of poor parents, he received a common-school education, and was apprenticed to the tailor's trade. About 1850 he was appointed a sergeant in the army, and serving through the various revolutions had attained the rank of gen. at the time of the French invasion. He rendered important service in fighting the French army supporting Maximilian till the battle of Amatlán, where he was captured, after which the French, fearing his military skill, shot him at Uruapán.

ARTEDI, *âr-tâ'dē*, PETER: 1705, Feb. 22—1735, Sep. 21; b. at Anund, province of Angermannland, Sweden: celebrated naturalist. He was at first designed for the priesthood, and entered the Univ. of Upsala, to pursue the usual course of philosophy and theology, but he soon betook himself to medicine. In 1728, Linnæus went to Upsala to study the same science, and intimacy sprung up between the young men. They worked together, and to a certain extent, on the principle of a division of labor. Physiology, chemistry, and mineralogy they pursued in common; but to this A. added ichthyology, and Linnæus ornithology and entomology. In 1734, A. sailed for England, and Linnæus went to Lapland, each having made the other his heir and executor of all his scientific documents. While in London, A. wrote the preface to his *Ichthyologia*. Next year he went to Leyden in Holland, where he found Linnæus just arrived from the north. Each showed the other the results of his labors. A.'s career was abruptly ended by his falling into one of the canals near Amsterdam.

A.'s only complete work is the *Philosophia Ichthyologica*. The *Synonymologica* is described as a work of extraordinary labor, but somewhat confused. Linnæus faithfully performed his duty as his friend's executor. He arranged, corrected, and completed his manuscripts, and published the whole, together with the life of the author, in 1738. According to Cuvier, the great work of A. is the first named, which gave a truly scientific character to the study of fishes. The only error of any magnitude which occurs in it is including the Cetaceæ among fishes. A. was also a distinguished botanist. He was the first to indicate, as a



## ARTEMIA—ARTEMISIA.

special characteristic, the presence or absence of involucre in the umbelliferous plants, whose species are so difficult to distinguish from each other. Linnæus has called a genus of these, in memory of his friend, *Artedia*.

**ARTEMIA**, *âr-te'mî-ă* [Gr. *Ar'temis*, Diana]: genus of *Entomostracans* belonging to the family *Branchipodidæ*. The *A. salina*, or Brine Shrimp, loves water so salt that most other marine animals die in it. At the salt-pans, at Lymington, Eng., the workmen call them *brine-worms*.

**ARTEMIS**: see **DIANA**.

**ARTEMISIA**, *âr-tê-mîsh'î-a*: Queen of Caria (reigning B.C. 352–350): wife of Mausolus, and celebrated for the magnificent mausoleum which she caused to be erected to her husband's memory. See **MAUSOLEUM**.

Another **ARTEMISIA**, queen of Halicarnassus, accompanied Xerxes in his expedition against Greece, and distinguished herself at the battle of Salamis (B.C. 480); she ended her life in consequence of an unfortunate attachment, by leaping from a rock.

**ARTEMISIA**, n. *âr'tê-mîzh'î-ă* [*Ar'temis*, one of the names of Diana, who presided over women in child-bed]: genus of plants of the nat. ord. *Compositæ*, sub-order *Tubulifloræ*, in which the flowers of the disk are hermaphrodite, those of the ray in one row, the bracts forming a roundish imbricated head, the receptacle naked or hairy, the achenia obovate, and destitute of pappus. The heads of flowers are numerous and small; the leaves are generally much divided. There are many species, herbaceous plants and shrubs, natives chiefly of temperate regions. They have generally an aromatic smell, more or less agreeable, and a warm, sometimes acrid and bitterish taste.—To this genus belongs **WORMWOOD** (*A. Absinthium*), the *Apsinthion* of the ancient Greeks, to whom its medicinal properties were well known. It is a native of Britain, the continent of Europe, and the northern parts of Asia and America, growing in waste places, by waysides, etc. It is a perennial, 2 to 4 ft. high; its leaves bipinnatifid and clothed with a silky down, and its small hemispherical drooping heads of flowers are of a dingy yellow color, and are produced in axillary panicles. It is aromatic and bitter, containing a bitter principle and an essential oil, both of great strength, upon account of which it is used in medicine in various forms (oil, extract, tincture, etc.), as a stomachic and anthelmintic or vermifuge. It was formerly in much use as a febrifuge. It is frequent in gardens, occupying an important place in the domestic pharmacopœia, and is an essential ingredient in a number of compound medicines. Its roots, and those of some other species of this genus, have been recommended in epilepsy.—**SEA WORMWOOD** (*A. maritima*, including a variety which has been called *A. Gallica*), a native of salt-marshes

## ARTEMISIA.

in Britain and other parts of Europe, has similar properties, and is occasionally used for the same purposes; also ROMAN WORMWOOD (*A. Pontica*), a native of the middle and south of Europe, but not of Britain—TARTARIAN WORMWOOD (*A. Santonica*), a native of Tartary, Persia, and other parts of the East; and INDIAN WORMWOOD (*A. Indica*), a native of the Himalaya, abounding at



Wormwood (*Artemisia Absinthium*).

elevations of 2,000–6,000 ft. Indian wormwood grows to the height of 12 ft. It is considered in India a powerful deobstruent and antispasmodic. TREE WORMWOOD (*A. arborescens*), a native of the s. of Europe and the Levant, is also larger and more shrubby than the common wormwood, which in characters and qualities it much resembles.—The dried flower-buds of a number of species of *A.* are sold under the names of WORMSEED and of *Semen Contra*, *Semen Cinæ*, *Semencine*, etc., and have long been in much repute as an anthelmintic. *A. Santonica*, and *A. Sieberi* (or *A. Contra*), a native of Palestine, are believed to yield much of the wormseed which is brought from the Levant, also *A. Judaica*, a native of the East and of Barbary, which is regarded as the principal source of the Barbary wormseed. The flower-bush of *A. glomerata*, *A. Lerchiana*, and *A. pauciflora*, natives of the banks of the Volga, are also said to form part of the wormseed of the shops;



## ARTEMUS WARD.

and those of *A. Vahlia* are collected in the n.e. of Persia, and form the *Semen Cinæ Levanticum* or *Semen Cinæ in grains*. The flower-buds of *A. cærulescens*, a Mediterranean plant, said to have been found on the sea-coast of England, form the anthelmintic called *Semen Seriphii* or *Barbotine*. Those of *A. camphorata*, another native of the s. of Europe, are used in the same way. Even those of *A. Absinthium* and *A. vulgaris* are used under the name of wormseed.—The plants from which the bitter aromatic liquor called *Extrait, Eau*, or *Crème d'absinthe* is prepared, are small low-growing species of *A.* (*A. mutellina*, *A. glacialis*, *A. rupestris*, *A. spicata*, etc.), found on the Alps and known to the inhabitants of the Alps by the name of *Genipi*. This liquor was first introduced as a febrifuge during the French campaign in Algeria in 1844, and was mixed by the French soldiers with their wine. They acquired a habit of drinking it diluted with water as a beverage; and its use rapidly extended, with very evil consequences. See ABSINTHE.—MUGWORT (*A. vulgaris*), which, a native of Europe, becoming American, like *A. Absinthium*, and often found in waste places, grows to the height of 3–4 ft., with pinatifid leaves and somewhat racemed small flowers, which have each five florets of the ray. It emits, when rubbed, an agreeable smell, and has a bitter taste. In Germany, the young shoots and leaves are used in cookery for seasoning. It is used also for the same medicinal purposes as wormwood, but is weaker. Its leaves, and those of some of the other species, are used as fomentations for cleansing and healing wounds.—SOUTHERNWOOD (*A. abrotanum*) is a shrubby plant with long straight stems, 3–4 ft. high, the lower leaves bipinnate, upper leaves pinnate, their segments hair-like. It is a native of the s. of Europe and middle parts of Asia, and has long been a favorite plant in cottage gardens in Britain. It has an aromatic and pleasant odor. The leaves are used to drive away moths from linen; and in some parts of the continent of Europe, as an ingredient in the manufacture of beer. The smell of this plant appears to be peculiarly disagreeable to bees, which retreat from it; and a little branch of southernwood is sometimes efficaciously used when they are swarming, to promote their ascent into the new hive placed over them.—TARRAGON (*A. Dracunculus*) is a perennial plant, native of Siberia, long cultivated in gardens in Britain. It has a branching stem 1–1½ ft. high, with narrow leaves. It is fragrant, and has an aromatic smell and taste. The leaves and tender tips are a favorite ingredient in pickles. An infusion of the plant in vinegar is used as a fish-sauce.—The leaves of *A. Maderaspatana* are regarded in India as a valuable stomachic, and are also used in anodyne fomentations.—MOXA (q.v.) is prepared by the Chinese from the leaves of *A. Moxa* and other species, the whole surface of whose leaves is covered with a thick down.—*A. acetica*, a Persian species, is said to have a strong odor of vinegar. Many species of *A.* belong to N. Amer., and characterize especially the dry, barren plains of the west.

ARTEMUS WARD: see BROWNE, CHARLES FARRAR.

## ARTERIES.

**ARTERIES, DISEASES OF:** morbid conditions of the arteries occasioned mostly by the deposition of *atheroma* (a Greek word signifying a tumor or deposit containing matter like *athērē*, meal or groats) in the deeper layers of the inner coat of the vessel; a new interlining to the artery being thus furnished. *Atheroma* (q.v.) has the effect of weakening, enlarging, and occluding arteries, according to the extent and period of the deposition. In the earliest stage, *atheroma* consists of a thin, soft, and clear membrane, lining a part or the whole of the tube. It seems a mere addition to the artery, in whose original coats there is no appearance of disease. It is probably a deposit on the inner surface from the blood. On the inner surface of the new coat, a similar layer gradually forms, and in the course of time becomes the foundation of subsequent formations; and when many strata have thus been deposited, the collective mass ceases to be transparent, and becomes converted into an opaque material similar to hardened albumen, and finally to ligament. Until this consolidation occurs, the coats of the artery are not much affected; but, by their adhesion to the hardened deposit, they lose their strength, elasticity, and natural color, and their functions are destroyed. The indurated deposit may now undergo one or other of these changes: it may either soften in its interior, in which case it degenerates into a pulpy mass of cholesterine, oil-globules, albuminous and chalky molecules; or it may be converted into a layer of hard, chalky, bone-like matter. This latter change (cretification or ossification) takes place only in the external oldest layers of thick deposits; and nothing intervenes between the bony plate and the middle coat of the artery, for the inner or lining coat partakes in the morbid change. It is obvious that either of these changes (softening or hardening) must gradually lead to disease of the arterial coats generally. The process of change is slow, and the change itself can be detected in the living subject only at an advanced stage. In the radial artery and others which lie superficially, the finger can often detect rings or tubes of chalky matter. Most commonly, however, the state of the arteries is detected by some secondary symptom.

Atheromatous deposit is attended at first with a narrowing of the calibre of the vessel, varying with the thickness of the deposit and most marked at the points of bifurcation. Smaller arteries may be completely obliterated, while the larger arteries may be very much contracted. Thus, the common iliac has been found to have its canal diminished by about one-half, and the great ascending branches of the arch of the aorta, the subclavian and carotid arteries, have been found very nearly closed. A later consequence of the same disease is dilation of the vessel. The power of the outer coats being insufficient to compress the deposit and to close in upon the blood, by which each contraction of the left ventricle of the heart distends them, they remain wide and distended during the relaxation of the ventricle, and the artery thus slowly expands; the enlargement being most marked at parts where



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there is most obstruction to the blood-current, as, for example, in curved arteries. These dilations are apt to terminate in regular aneurism—a tumor containing blood, and communicating with the cavity of an artery. See ANEURISM. The changes already described have an effect on the retractile power of the arteries. A healthy artery, if cut across, may shorten to the extent of an inch and a half, as has been actually measured by Mr. Moore ('Diseases of the Arteries,' in Holmes's *System of Surgery*, vol. iii. p. 329); but the retractile power is destroyed by the deposition of bony rings or plates. But although incapable of shortening, the arteries sometimes become abnormally lengthened, and consequently become not only dilated, but also tortuous. If the outline of superficial arteries thus affected be watched, each pulsation of the heart is seen to increase their curvature; and deep-seated arteries (as the iliac) are thus often forced from their normal positions. Another condition involving much danger is this: an ossified artery loses the smoothness which the interior of the vessel ought to present, and from the displacement or cracking of a bony plate there may be sharp, rough projections exposed, to which the fibrine of the circulating blood may adhere. These little clots, becoming detached, may be carried with the blood till they become arrested, and plug up an artery, thus presenting cases of embolism or thrombosis (q.v.). Again, the relation of this disease to accidents and surgical operations on arteries is obvious. A blow may crush a diseased artery, when a healthy, elastic vessel might have escaped injury. Such a slight movement as suddenly lifting the arm to the head, for the purpose of securing the hat in a sharp gale, has been known to have been followed by aneurism of the axillary artery. A ligature applied to any ossified artery is very apt to cause it to break, and the difficulty of securing such vessels is often very great. It is to this form of disease that most of the failures of operations for aneurism are due.

An important cause of occlusion of arteries is the closing of the canal by intrusion of a foreign body, especially by fibrinous plugs originally formed in the heart, and transported to other parts in the stream of the blood. When a large artery, for example the principal artery of one of the limbs, is 'suddenly plugged in its higher part, a sensation of severe pain is commonly the immediate result of the accident. In some cases the pain extends along the course of the vessel, which, though pulseless, is extremely tender; in others, the suffering is referred to some distant part of the limb, as, for instance, to the calf. Signs of a deficient circulation succeed, and they may amount to pallor, loss of temperature, numbness of the surface, or even to that "torpor" which is observed to precede the total death of a limb in certain cases of injuries of vessels. Such torpor implies not only a loss of circulating blood, but also a cessation of all feeling and motor power in the limb.'—Moore, *op. cit.*, p. 335. Although gangrene (q.v.) is always to be feared as the result of an

## ARTERIOTOMY—ARTERY.

obstructed artery of large size, it does not invariably follow; as a collateral circulation may be established, and the life of the limb may be thus saved. Very young persons will endure the obliteration of very large vessels without gangrene; and a case is on record (*Med. Chir. Trans.*, vol. xxix. p. 214) in which 'all the main arteries of both upper extremities and of the left side of the neck were reduced to solid cords,' and yet no gangrene ensued. From the description of the symptoms, the nature of a case of sudden occlusion of a large artery by a plug may possibly be recognized, or, at all events, suspected even by a non-professional observer. Medical aid must at once be sought. The early indications of treatment are to preserve the temperature of the part, to favor the establishment of a collateral circulation, to protect the limb from irritation or injury, to give nourishing blood-making food, and to relieve pain by the judicious use of opiates. The later treatment, if the affection is not checked, is described in the article GANGRENE.—*Arteritis*, or *Inflammation of the Arteries*, was a disease which was formerly recognized by physicians. No such specific general disease is now recognized, but the changes which have been already described as occurring in consolidated atheromatous deposits—either softening or ossification—are accompanied by an unnaturally vascular condition of the attenuated arterial walls, extending to true local inflammation, and even to suppuration.

**ARTERIOTOMY**: the opening of an artery: an operation that has been strongly advocated in those cases in which it is desirable to produce upon the cerebral circulation more decided and immediate effect (as in severe forms of sanguineous apoplexy) than could be produced by ordinary venesection. It is supposed by some surgeons to relieve pressure on the brain more efficiently than opening the jugular vein could do; and whether this is the case or not, it is simpler and less dangerous. The only vessel operated on is either the temporal artery itself or one of its main branches. The operation is a simple one, but should, of course, be undertaken only by a surgeon. To arrest the flow of blood when sufficient has been taken, the artery should be completely divided, and after the parts have been sponged, a compress, or small pad, should be applied to the wound, and secured by a bandage, which must be carefully adjusted, so as, if possible, to remain undisturbed for four or five days, when it may be removed, and the wound covered with a strip of plaster.

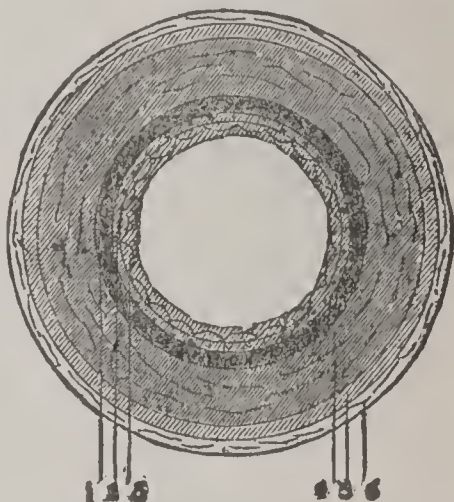
**ARTERY**, n. *âr'tér-î* [L. and Gr. *artēriā*, a windpipe, an artery]: one of the vessels that convey the blood from the heart to all parts of the body. **ARTERIAL**, a. *âr-tē'rî-ăl*, of or contained in arteries. **ARTERIALIZE**, v. *âr-tē'rî-ăl-îz*, to render the blood coming from, or present in, the veins similar to that contained in the arteries; to oxygenate blood. **ARTE'RIALIZING**, imp. **ARTE'RIALIZED**, pp. *-îzd*. **ARTERIALIZATION**, n. *âr-tē'rî-ăl-î-zâ'shûn*, the process of making into arterial blood. **ARTERIOTOMY**, n. *âr-tē'rî-ôt'ô-mî* [Gr. *tomē*, a cutting]: opening an artery to let blood.



## ARTERY.

**-ARTERIOLOGY**, n. *ár-tě'rĩ-ól'ô-jĩ* [Gr. *artēriā*, an artery; *logos*, a discourse]: a discourse regarding the arteries; that part of medical science which treats of the arteries. **ARTERITIS**, *ár-tě-rĩ'tis*: see **ARTERIES**, **DISEASES OF**.

**ARTERY** [named from the old idea that these tubes were air-carriers]: the vessels through which the blood passes from the left side of the heart to the tissues throughout the body. The structure of an arterial tube is very complex, and a section of it may be roughly subdivided into three layers, called the coats of the artery: an external, which is elastic and distensible; a middle, which is muscular, contractile, and brittle; an internal, also brittle, smooth, and transparent, being lined with epithelium on the side washed by the blood. The tube is also enveloped in cellular tissue, termed the *sheath* of the A. When an A. is wounded by a sharp instrument, the effect varies with the direction of the cut. Thus, if longitudinal, the edges may not separate, and the wound may heal without much bleeding; if oblique or transverse, the edges gape, and a nearly circular orifice allows of a profuse hemorrhage. If the A. be completely divided, its walls do not collapse like those of a vein, but pass through certain changes provided by nature to prevent fatal bleeding. The cut orifice contracts and each coat retracts from the coat external to itself, so that the internal coat is retracted farther than the middle, and the middle farther than the external coat. In addition to this retraction, the three coats curl inward, thus considerably narrowing the orifice, and presenting a surface on which a clot is more readily formed. This clot extends to the first large branch of the artery. The part of the artery thus plugged becomes in course of time a mere fibrous cord, and the portion of the body previously supplied by this artery is nourished by collateral circulation (see **ANASTOMOSIS**). When an A. is compressed by a ligature, the brittle inner and middle coats crack, curl inwards, and heal. See **BLEEDING**.



Subdivisions of Arterial Wall.

- |                 |   |           |
|-----------------|---|-----------|
| 1. Epithelial,  | } | internal. |
| 1. Fenestrated, |   |           |
| 3. Muscular,    | } | middle.   |
| 4. Elastic.     |   |           |
| 5. Fibrous.     | } | external. |
| 6. Areolar.     |   |           |

The arteries of the human body are all offsets, more or less direct, of the aorta. As each main trunk passes into a portion of the body, it divides into two principal divisions: one, which breaks up into branches for the supply of the tissues in the vicinity—the A. of *supply*; and another, which passes almost branchless to supply the parts beyond—the A. of *transmission*. These, however, anastomose (q.v.) freely, so that the distant tissues are not solely

## ARTESIAN WELLS.

dependent for their supply on only one arterial trunk. Thus, the femoral A. divides in the groin into the profunda, or *deep* femoral, to supply the thigh, and the *superficial* femoral, to supply the leg below the knee. Again, the common carotid divides into *external* carotid, to supply the neck and head, and the *internal* carotid, to supply the brain. Although arteries have generally the same distribution or arrangement of branches, they occasionally vary, and thereby are apt to puzzle a superficial anatomist. Mr. Thomas Nunn of London, an excellent human anatomist, has clearly shown that these anomalies in arterial distribution are all governed by the law of arterial distribution just mentioned, a fact which not only simplifies the study of arterial anatomy, but assists the operative surgeon out of perplexing positions. For the principal arteries, see their distinctive titles. The best authority on arteries is the splendid work of R. Quain. See ARTERIES, DISEASES OF.

ARTESIAN-WELLS, n. *âr-tê'zhăn*: borings or perforations made in the earth, in order to obtain a constant flow of water—so called from *Artois*, in France (the anc. *Artesium*), where first used. The possibility of obtaining water in this way in a particular district depends on its geological structure. All rocks contain more or less water. Arenaceous rocks receive water mechanically, and, according to their compactness and purity, part with a larger or smaller proportion of it. A cubic yard of pure sea-sand can contain, in addition to the quantity of dry sand which occupies that space, about one-third of its bulk of water. It would part with nearly the whole of this into a well sunk in it, and regularly pumped from. Chalk and other rocks, composed of fine particles, closely compacted together, contain as large a proportion of water; but from the power of capillary attraction, little or none of this water would be drained into a well sunk in such rock. From the existence, however, of numerous crevices in chalk through which the water freely flows, and from the general presence of a larger quantity of water than the porous rock is able to retain, wells sunk in chalk often yield water. There is yet a third class of rocks, which are perfectly impervious to water: such are clays, which are absolutely retentive, neither allowing water to be obtained from them nor to pass through them. When such rocks occur in basins (q.v.) in alternating layers, and in such order that pervious beds are inserted between impervious ones, it is evident that if a perforation is made through the retentive barrier-bed in the lower portion of the basin, the water contained in the water-logged strata will rise through the bore to a height depending upon the pressure of water which has accumulated in the confined sloping space between the two impervious beds.

The American system of driving wells, invented by Col. N. W. Green, was first applied 1861, and patented 1868. The plant includes an Andrews patent point for penetrating the earth, this point being coupled to a pipe, on which,



## ARTESIAN WELLS.

after it has been driven down to water, an ordinary pump is screwed on and the air exhausted, when the water rises rapidly in the tube, whence it is readily lifted by the pump. See BORING. A large number of these wells are in use in the United States for furnishing water for irrigation, stock-raising, brewing, etc. Important wells are in St. Louis (begun 1849), Chicago, Louisville, New York, Columbus, O., Terre Haute, Ind., Charleston, S. C. (begun 1848), New Orleans, La., Titusville, Penn., Philadelphia, Penn., Andover, S. Dak., and Rondout, N. Y. The deepest of these wells is that driven for the St. Louis Insane Asylum, 1866-69, 3,843.5 ft. in depth, with a diam. two-thirds of the way of 4½ in. A well in Chicago of 1,200 feet discharges about 1,250,000 gals. with a head of 125 ft. above Lake Michigan. Gen. Pope, when in command of Texas, 1855, sunk a well in the Staked Plains 900 ft., and obtained good water.

Many such wells are in London and its vicinity; those which form the ornamental fountains in Trafalgar Square descend into the upper chalk to a depth of 393 ft. One of the most famous artesian wells is that of Grenelle, in the outskirts of Paris, where the water is brought from the gault at a depth of 1,798 ft. It yields 516½ gals. of water in a minute, projected 32 ft. above the surface; temperature, 81°·7 F. An artesian well in course of construction at Pesth yielded, at a depth of 3,100 ft., 175,000 gals. of water per day, of a temperature of 161° F., projected 35 ft. above the surface. It is to be sunk till the water reaches 178° F.

It is believed that the Chinese have been long acquainted with artesian wells. Such wells have been in use for centuries in Austria, especially in the neighborhood of Vienna, where they are abundant. No knowledge existed as to their source, and consequently the boring for them was engaged in and conducted in a rude and empirical manner. An excavation was made till a bed of clay was reached; on this a perforated mill-stone was laid, and through the hole the clay was bored until water rose. As soon as geology took the position of a science, and the theory of A. W. was propounded, the engineer was able, after the geological survey of a district, to discover whether a supply of water could there be obtained in this way. Already, districts formerly dry and arid have received a plentiful supply of water by means of such wells, and many more applications have yet to be made. (Tchihatchef, at the British Association in 1882, affirmed that A. W. were made in old Greek times in the Sahara, at Baalbek, etc.; and that crabs are found at the bottom of recent ones). Artesian borings have been executed in the Sahara of the province of Constantine with remarkable success. The first attempt, after a few weeks' labor, produced a constant stream, forming a river and yielding 4,010 quarts of water per minute. at a temperature of 78° F. In 1880, there were above 150 such borings in the province. The result is proving beneficial not only to the country materially, but also to the character and habits

## ARTEVELDE--ART EXHIBITIONS.

of its nomadic Arab inhabitants. Several tribes have already settled down around these wells, and forming thus the centres of settlements, have constructed villages, planted date-palms, and renounced their previous wandering existence.

A. W. have supplied a portion of the data upon which the internal temperature of the earth has been calculated. They have their origin below that zone which is affected by the changing superficial temperature of the seasons, and consequently the water is of a constant temperature. Thus the Grenelle artesian well has a temperature of  $81^{\circ}7$  F., while the mean temperature of the air in the cellar of the Paris Observatory is only  $53^{\circ}$ . MM. Arago and Walferdin observed the temperature as the work proceeded, and found that there was a gradual and regular increase downwards. The latter gentleman made a series of very accurate and careful observations on the temperature of two borings at Creuzot, within a mile of each other, commencing at a height of 1,030 ft. above the sea, and going down to a depth, the one of 2,678 ft., the other about 1,900 ft. The results, after every possible caution had been taken to insure correctness, gave a rise of  $1^{\circ}$  F. for every 55 ft. down to a depth of 1,800 ft., beyond which the rise was more rapid, being  $1^{\circ}$  for every 44 ft. of descent. There are many very deep borings in the United States.

ARTEVELDE, *âr'tă-vêl-deh*, JACOB: d. 1345, Aug. 19: a brewer of Ghent, celebrated as a popular leader in the 14th c. In the war between England and France, he gave his aid to the former, while the counts of Flanders supported the latter. A., after gaining great advantages over the party of the nobles, went too far when he proposed that the son of Edward III. of England should be elected Count of Flanders. For this the Flemings were not prepared, and, in consequence, A. was killed in a popular insurrection. His son Philip, in 1381, was leader of the people of Ghent in their civil war against Bruges, and gained a victory over Count Louis. The latter was afterwards assisted by Charles VI. of France, and Philip was defeated and slain at Rosbeke, 1382.

ART EXHIBITIONS: public displays of the works of living artists, with the view, on the one hand, of affording gratification and instruction to the community, and, on the other, of procuring purchasers for the works exhibited. They have taken place in most of the principal towns of Europe, for more than a century and a half. Though sometimes connected with Art Unions (q.v.), A. E. are much older institutions, though as the offspring of a necessity which did not exist in earlier times they are essentially modern. So long as artists were patronized chiefly by the church, by their respective governments, or by individuals of sovereign rank, their works were placed either in churches, in public buildings, or in palaces, and were thus continually exhibited to the public; but when private patronage came to be their chief support, and their works, if sold at all, were certain to be buried in private houses, the necessity for making arrangements by which they



## ART EXHIBITIONS.

could be displayed to the public either before they were disposed of, or afterwards with the consent of their owners, became apparent. Until aided by Art Unions, A. E. for the most part had no success. The earliest collective art exhibition was probably that of the members of the Acad. of Fine Arts at Rome; anything of the kind which had previously existed being confined to the works of a particular artist and his pupils, enriched perhaps by a few contributions from his friends. Something of this earlier character probably attached to these Roman exhibitions; and the first art exhibition, in the sense in which we now understand it, seems to have been that of the French Academy, 1673. From 1745 to the period of the Revolution, this exhibition, which from its commencement had been confined to the works of members of the Academy, took place biennially. During the Revolution it was thrown open to foreign artists, and in 1796 it was again made annual. An exhibition was attempted in England, 1760, but it was not till 1769 that the regular exhibitions of the Royal Acad. commenced. The works exhibited in 1760 were only 130, the number of exhibitors being 69; in that of 1880 there were exhibited 1,650 works by about 850 artists. The annual revenue which the Acad. derives from the fee of one shilling by each visitor has also been steadily increasing. The exhibition of the Scottish Acad., next in importance, dates from 1826. To the first exhibition, 178 works were sent by 27 contributors; the exhibition of 1880 consisted of 1,120 works, contributed by 502 artists. The annual revenue of the Scottish Acad. from this source exceeds £2,500. The only other exhibition of the same class in the United Kingdom is that of Dublin, supported by an annual grant from government—the exhibitions of London and Edinburgh being merely furnished with rooms erected at government expense. Several private societies in London and the provinces, however, have similar exhibitions: among these are the British Institution, the Soc. of British Artists, the National Institution, the Soc. of Painters in Water-colors, and its rival, the New Soc. of Painters in Water-colors. There are also exhibitions in several of the large provincial towns, such as Manchester, Liverpool, Glasgow, etc. On the continent of Europe, wherever an acad. of art exists, there is now an exhibition, which takes place for the most part annually, sometimes biennially. In all the large cities, and in many smaller cities of the United States, and in the chief universities and colleges, there are permanent art collections, besides important annual exhibitions under the charge of private societies in increasing numbers.

The London Exhibition of 1851, commonly known as the *Great Exhibition*, was not only on a larger scale, but introduced new features into these displays. Though confined to industrial objects and works of plastic art, it gave an impulse to A. E. strictly so called, which showed itself almost simultaneously in the great international artistic exhibition of Brussels; and even those exhibitions which have been formed more closely on its model—those of

## ARTFUL—ARTHUR.

Dublin and New York, 1853, London, 1862. Paris, 1867, Vienna, 1873, Philadelphia, 1876, and Paris, 1878—all have included the fine arts.

ARTFUL, ARTIFICE, etc.: see under ART.

ARTHANITIN, *âr-thân'it-in* [from *Arthanita officinalis*, a plant now called *Cyclamen Europæum*]: in chem., a crystalline substance which may be extracted from the roots of the *Cyclamen Europæum*, *Primula veris*, *Anagallis arvensis*, and *Limosella aquatica*; called also *Cyclamin*. It is purgative, besides producing vomiting.

ARTHRITIC, a. *âr-thrît'ik*, or ARTHRITICAL, a. *âr-thrît'-î-kûl* [Gr. *arthron*, a joint]: pertaining to the joints or to the gout. ARTHRITIS, n. *âr-thrît'is*, inflammation of the joints; the gout. See JOINTS: RHEUMATISM: GOUT. ARTHRODYNIA, n. *âr-thrô-dîn'î-ă*, pain in the joints; chronic rheumatism. ARTHRODYNIC, a. *-îk*, pertaining to. ARTHROLOGY [Gr. *arthron*, joint; *logos*, discourse]: a discourse concerning the joints; that part of anatomical science which treats of the joints. ARTHROSIS, n. *âr-thrô'sis*, articulation.

ARTHRODIA, n. *âr-thrô'dî-ă* [Gr. *ar'thrôō*, I fasten by joints]: a joint in which the head of one bone is received into the socket of another; a ball-and-socket joint. ARTHRODIAL, a. pertaining to.

ARTHROGASTRA: see ARACHNIDA.

ARTHROLOBIUM, *âr-thrô-lô'bî-ûm* [Gr. *arthron*, a joint; *lobos*, a legume]: joint-vetch; a genus of plants belonging to the leguminous order.

ARTHRONOMALUS, *âr-thrô-nôm'âl-ûs* [Gr. *arthron*, a joint; *anômalos*, uneven, irregular]: a genus of centipedes. *A. longicornis*, a British species, is phosphorescent.

ARTHROPODA, n. plu. *âr-thrôp'ô-dă* [Gr. *arthron*, a joint; *podes*, feet]: those articulate animals such as crustaceans, spiders, and insects, which are provided with jointed limbs. This term is now used instead of Cuvier's *articulata* (q. v.).

ARTHUR, King of a tribe of ancient Britons: supposed to have lived 6th c. He is usually represented as a Christian prince, struggling bravely to maintain the liberty and faith of his country against the pagan Saxons, but there is no evidence for the statement that he fought against the Saxon Cerdic. Neither the Welsh bards nor Nennius assent to this; in fact, it is merely an inference drawn from the supposition that the scene of A.'s exploits was the w. and s.w. of England. But Mr. Skene (*The Four Ancient Books of Wales*, vol. i., pp. 50-60) seeks to prove from an examination of Nennius (*Historia Britonum*, cap. 50), that the localities of the twelve great battles which A. fought are in Strathclyde, and therefore that he belongs to the region now called Scotland rather than to England. If there is any reality in A.'s history at all, this is probably the correct view of it, but the influence of Geoffrey of Monmouth's fictions, and of the French romances, succeeded in fixing the Cumbrian prince in the more important part of the



island. It is a curious fact that no mention whatever is made of A. by the venerable Bede, the oldest of our historians, or by the annalists of the *Saxon Chronicle*; and Mr. Skene's explanation, that these authorities only 'record the struggle between the Britons and the Saxons south of the Humber,' is hardly satisfactory.

In the lays of the Welsh bards, supposed to be as early as the 6th and 7th centuries (although no manuscript is extant of older date than the 12th c.), A. and his brave companions are celebrated, but modestly and without miracle. It is in Nennius that the legendary additions begin to develop themselves, though Mr. Skene does 'not hesitate to receive the Arthur of Nennius as the historic Arthur.' Then follow at a distance of three or four centuries the so-called Armoric collections of Walter, arch-deacon of Oxford, from whom Geoffrey of Monmouth (q.v.) professes to translate, and in which the marvellous and supernatural elements largely prevail. Here for the first time the magician Merlin comes into association with A. According to Geoffry, A.'s father, Uther, conceiving a passion for Igera, wife of Gorlois, Duke of Cornwall, is changed by Merlin into the likeness of Gorlois, and A. was the result. After his father's death, A. becomes paramount leader of the British, and makes victorious expeditions to Scotland, Ireland, Denmark, Norway, and even to France, where he defeats a great Roman army. During his absence, his nephew, Modred, revolts, and seduces Prince A.'s wife, Guanhumara. A., returning, falls in a battle with his nephew; and is carried to the Isle of Avallon to be cured of his wounds. Geoffrey's work apparently gave birth to a multitude of fictions which came to be considered as quasi-historical traditions. From these, exaggerated by each succeeding age, and recast by each narrator, sprung the famous metrical romances of the 12th and 13th centuries, first in French, afterwards in English, from which modern notions of A. are derived. In these his habitual residence is at Caerleon, on the Usk, in Wales, where, with his beautiful wife Guinevere, he lives in splendid state, surrounded by hundreds of knights and beautiful ladies, who serve as patterns of valor, breeding, and grace to all the world. Twelve knights, the bravest of the throng, form the centre of this retinue, and sit with the king at a round table, the 'Knights of the Round Table.' From the court of King A., knights go forth to all countries in search of adventures—to protect women, chastise oppressors, liberate the enchanted, enchain giants and malicious dwarfs, is their knightly mission. A Welsh collection of stories called the *Mabinogion*, of the 14th and 15th centuries, translated into English by Lady Charlotte Guest, 1849, gives an idea of the Arthurian legends. Some of the stories 'have the character of chivalric romances,' and are therefore probably of French origin; while others 'bear the impress of a far higher antiquity, both as regards the manners they depict, and the style of language in which they are composed.' These latter rarely mention A., but the former belong, as Mr. Skene puts it, to the 'full-blown

## ARTHUR.

Arthurian romance.' Early in the 12th c., the Arthurian metrical romance became known in Germany, and there assumed a more animated and artistic form in the *Parzival* of Wolfram of Eschenbach, *Tristan and Isolt* of Gottfried of Strasburg, *Erec and Iwein* of Hartmann, and *Wigalois* of Wirnt. The most renowned of the heroes of the Arthurian school are Peredur (Parzival or Perceval), Tristan or Tristram, Iwein, Erec, Gawein, Wigalois, Wigamur, Gauriel, and Lancelot. From France, the Arthurian romance spread also to Spain, Provence, Italy, and the Netherlands, and was again retransplanted into England. One of the publications that issued from the press of Caxton (1485), was a collection of stories by Sir Thomas Malory, either compiled by him in English, from various of the later French prose romances, or translated directly from an already existing French compendium. Copland reprinted the work in 1557, and in 1634 the last of the black-letter editions appeared. A reprint of Caxton's *Kynge Arthur*, with an introduction and notes by Robert Southey, was issued in 1817 (*The Byrth. Lyfe, and Actes of Kyng Arthur*, etc., 2 vols. 4to). The best edition is that by Thomas Wright (Lond. 3 vols., 1866) from the text of 1634. The name of King A. was given during the middle ages to many places and monuments supposed to have been in some way associated with his exploits, such as 'Arthur's Seat' near Edinburgh, 'Arthur's Oven' on the Carron near Falkirk, etc. What was called the sepulchre of his queen was shown at Meigle, in Strathmore, in the 16th c. The interest of the legends about King A. and his knights has been revived by Tennyson's *Idylls of the King* (1859 *et seq.*), and some of Wagner's operas. See Turner's *History of the Anglo-Saxons*; Ritson's *King Arthur*; Villemarqué, *Contes Populaires des Anciens Bretons* (1842); Grässe, *Sagenkreise des Mittelalters* (1842); Skene's *Four Ancient Books of Wales* (1868); Glenie's *Arthurian Localities* (1869); Cox's *Popular Romances of the Middle Ages* (1871); Fontan, *Arthur, ou le Roi-chasseur* (1874).

ARTHUR, Prince of Brittany: see King JOHN.

ARTHUR, CHESTER ALAN: twenty-first president of the United States; 1830, Oct. 5.—1886, Nov. 18, b. in Franklin co., Vt.; son of a Baptist minister, of Scotch-Irish extraction. He distinguished himself as a student at Union College, New York; studied law, and was admitted to the bar at an early age. At the outbreak of the great civil war, 1861, he held the post of inspector-general; and during the war was quartermaster-general for the New York forces. He subsequently returned to law practice, and became the head of an eminent law firm. A. was prominent in politics, on the republican side; and in 1871 Pres. Grant appointed him collector of customs at the port of New York. Not being an advocate of the administrative system known as Civil Service Reform, which Pres. Hayes favored, the pres. removed him from this post, 1878, and he returned to the practice of law. He was a leader of the republican party in the state of New York; and



## ARTHUR'S SEAT—ARTICHOKE.

though belonging to the section of the republicans opposed to that represented by Gen. Garfield, was elected vice-pres. of the United States when Garfield was elected to the presidency, 1881. The death of Garfield, resulting from an assassin's pistol-shot, called the vice-pres. to the supreme magistracy; and, 1881, Sept. 22, A. was inaugurated president, in which office he served till the end of the term, 1885, March 4. Returning to New York, his already failing health restrained him from public activity, and his death occurred in the following year. As a political leader A. had great energy and success, though his later leadership became unfortunately identified with a faction in his party; as president, he rose to the new demands and the peculiarly difficult duties of the exalted office to which an assassination had introduced him; winning in large degree the approval of former opposers by the dignity and fidelity of his administration.

**ARTHUR'S SEAT:** a hill in the immediate vicinity of Edinburgh, 822 ft. above the level of the sea. The ascent is easy, and the prospect from the top unrivalled. A. S. is supposed to derive its name from Arthur, the British king. When the hill received this appellation is not known; but at the close of the 15th c. the poet Kennedy mentions 'Arthur Sate or ony hicher hill.'

The hill is formed of a mass of trap of various species, upheaved through the carboniferous strata of Central Scotland, and presenting on the w. and s. sides, at the height of 570 ft., a perpendicular range of precipices, called Salisbury Crags, 60 to 80 ft. high. The trap is in tabular masses, and has elevated and hardened the carboniferous sandstone, shale, and limestone beds, which dip e., and crop out on the w., besides being broken through and overflowed by the trap-rocks. In the centre of the hill, the trap often encloses fragments of sandstone, and divides it by veins. The central and upper part of the hill, and the remarkable columns called 'Samson's Ribs,' are of basalt.

**ARTIAD**, n. *âr'tĩ-ăd* [Gr. *artios*, complete, even, opposed to odd]: in *chem.*, name given to elements of even equivalency, as dyads, tetrads, etc.; those of uneven equivalency, as monads, triads, etc., are called perissads [Gr. *perissos*, uneven].

**ARTICHOKE**, n. *âr'tĩ-chōk* [F. *artichaut*—from It. *articiocco*]: a thistle-like perennial plant, now growing wild in the s. of Europe, but probably a native of Asia; the *Cyn'ăra scolymus*. The genus *Cynara* belongs to the natural order *Compositæ*, sub-order *Cynarocephalæ*, and is distinguished by the bracts of the involucre being fleshy at the base, and emarginate, with a hard point and the receptacle fringed. *C. scolymus* has the radical leaves 3–4 ft. long, somewhat spiny, some of them pinnatifid, some undivided. The stem is two or three ft. high, branched, with large heads of violet-colored (sometimes white) thistle-like flowers at the summits of the branches. The involucre is tumid, and consists of fleshy, roundish-ovate, crenate, acuminate,

## ARTICLE.

imbricated scales. The seeds are elongated and quadrangular, with smooth and firmly attached pappus. The plant has been long cultivated for the sake of the delicate succulent *receptacles* of the heads of flowers, taken before the flowers expand, which are boiled and eaten, or, on the continent of Europe, eaten raw with salt and pepper. The part used is the same which in thistles is called by children the *cheese*, and is sometimes eaten by them. The tender central leaf-stalk is also occasionally used in the same way as that of the Cardoon. Several varieties are in cultivation, differing in the more or less spiny leaves, and the more or less globose form of the head. Artichokes are generally propagated by rooted slips or suckers in spring. These are planted in rows about four ft. asunder, and two ft. apart in the row. The A. bed continues productive for several years. Seaweed is an excellent manure for it.—The CARDOON (q.v.) belongs to the same genus.—The JERUSALEM A. (q.v.) is a totally different plant.

ARTICLE, n. *âr'tî-kl* [F. *article*—from L. *artic'ulus*, a little joint—from *artus*, a joint: It. *articolo*]: a jointed thing or part; a clause or item; a particular thing; a contribution in a periodical; in *gram.*, a word put before a noun to point it out and limit its application: V. to bind by conditions; to stipulate. ARTICLED, pp. *âr'tî-kl'd*: ADJ. bound by conditions. ARTICULATE, v. *âr-tîk'û-lât* [L. *articulātus*, furnished with joints]: to unite by means of joints; to pronounce words distinctly; in *OE.*, to make terms; to treat: ADJ. distinct; jointed. ARTICULATELY, ad. *-lî*. ARTICULATENESS, n. the quality of being articulate. ARTICULATION, n. *âr-tîk'û-lâ'shûn*, the uniting together by means of joints, as in the bones of a skeleton; distinct pronunciation; an arrangement of joints. ARTICULATING, imp. ARTICULATED, pp.: ADJ. possessing joints. ARTICULATOR, *âr-tîk'û-lâ'tér*, one who articulates. ARTICULAR, a. *âr-tîk'û-lér*, of or belonging to the joints. ARTICULARLY, ad. *-lî*. ARTICULATA, n. plu. *âr-tîk'û-lâ'tâ*, one of the great divisions of the animal kingdom, designating those creatures which are encircled by jointed rings, as worms, lobsters, etc., now frequently known by the name ARTHROPODA. ARTICLES OF ROUP, in *Scot.*, the written or printed conditions binding on purchasers at a public sale by auction. ARTICLES OF WAR, the military code of laws for the government of soldiers. LORDS OF ARTICLES, in *Scot. hist.*, the committee of Scottish parliament who prepared all articles and bills in proper form to be placed before parliament. THIRTY-NINE ARTICLES, the summary of doctrines containing the authorized teaching of the Church of England.

ARTICLE: in general a part of a systematic whole. Thus, we speak of the several articles of a confession; the articles of war; a leading article, etc.

The use of A. as a grammatical term arose as follows: In such a sentence as, 'He found *that* (or *the*) man *that* he was looking for,' the Greeks considered the defining particles as connecting the two parts of the sentence, and



## ARTICLES OF FAITH—ARTICLES OF WAR.

called them joints (Gr. *arthra*, Lat. *articuli*); the name was subsequently confined to the first of the two, the other being called the relative.

In English, there are two articles—the definite *the*, and the indefinite *a* or *an*; and other modern languages have corresponding words. But articles are not essential to language. The Latin had no articles, and the Greek, as well as the older Germanic languages, the Mæso-Gothic and Old Norse, e.g., had only the definite *A*. ‘In no language,’ says Dr. Latham, ‘in its oldest stage, is there ever a word giving, in its primary sense, the idea of *an* or of *the*. As tongues become modern, some word with a *similar* sense is used to express the relation. In the course of time, a change of form takes place, corresponding to the change of meaning.’

The definite articles originate uniformly in demonstrative pronouns. Eng. *the* is only a weakened form of *that* (Anglo-Sax. *thæt*). The same is the case with Ger. *der*; and French *le*, Ital. *il* and *lo*, and Sp. *el*, are all from the Lat. *ille*, ‘that.’ In like manner, *an* or *a* is from the old form of *one* (ane); Ger. *ein* is both *one* and *a*; and so are Fr. *un*, Ital. and Sp. *uno*, both from Lat. *unus* = *one*.

In the Scandinavian tongues, the article is attached to the end of the word; the Danish, e.g., writes *kong-en*, the king; *hus-et*, the house.

**ARTICLES OF FAITH:** summary of religious views, set forth by a church or a company of churches, and used in many cases as a denominational standard. See CREEDS AND CONFESSIONS.

**ARTICLES OF WAR:** regulations made for the government of the military and naval forces of the country; laws, or rules, governing the modes of trial and of punishment for breaches of discipline, and denominating the offenses to which these modes are appropriate.

*United States Army.*—The articles in force are comprised in an act of congress 1806, Apr. 10, and are 128 in number, of which 80 refer to punishments, the remainder relating to organization of courts-martial and courts of inquiry, and cognate subjects. The following is a summary. Officers can be tried only by general courts-martial, and, unless impossible, only by officers of their own or higher rank. Officers commanding army corps, regts., garrisons, or forts, are empowered to order courts for trial of enlisted soldiers for all offenses except such as are capital; and in time of war, a field officer can be detailed in each regt. to try such minor offenses. Such courts cannot punish by imprisonment for more than 1 month, nor by fine exceeding one month’s pay. Officers under arrest are entitled to see a copy of charges brought against them, and to trial within a specified time. In time of peace any gen. officer in command of an army or a dept., and in time of war any division or brigade commander, is authorized to order a general court-martial; but in case such gen. officer or commander is the accuser, the court is appointed by the pres., and its findings must be sent to the sec. of war, and by him to the pres. for approval. Offenses in-

## ARTICLES, THE THIRTY-NINE.

clude unlawful enlistments, wasting or spoiling ammunition or accoutrements, disrespect toward a superior officer, challenge to a duel, fraud, embezzlement, etc. Punishments include fine, imprisonment, dismissal, and death. Since 1875, flogging as a punishment has been abandoned; and branding, marking, or tattooing are forbidden. The punishment of death can be inflicted only after confirmation by the pres., except in the case of spies, mutineers, and murderers, guerillas, and others who commit crimes in violation of the laws of warfare; and in the cases of sleeping on post, inciting to mutiny, cowardice in the presence of the enemy, etc.

*United States Navy.*—Sixty articles govern procedure in cases of insubordination or crime, and are applied by courts-martial. The offenses and punishments enumerated vary little from those above cited for the army. No officer is subject to dismissal or death, except when the sentence has been confirmed by the pres.; for all other cases the designated punishment can be inflicted by the officer who orders the court. Offenses committed on shore receive the same punishment as if committed at sea. The proceedings of a court-martial are subject to revision, and the sentence to remission or mitigation, by the officer ordering the court-martial. The punishment of death, where authorized, need not necessarily be inflicted by the court-martial, which is empowered to substitute therefor imprisonment for life.

ARTICLES, THE SIX: often mentioned in the ecclesiastical history of England in the 16th c.; imposed by act of parliament, 1539, when Henry VIII. was displeased with some of the bishops most favorable to the Reformation, and their opponents for a time regained the ascendancy. These A. asserted the doctrine of transubstantiation, declared communion in both kinds not to be necessary, condemned the marriage of priests, enjoined the continued observance of vows of chastity, and sanctioned private masses and auricular confession. The act imposing them was popularly called 'the six-stringed whip.' Severe penalties were appointed for writing or speaking against them, and for abstaining from confession or the sacrament at the accustomed times, for priests failing to put away their wives, and for persons writing or speaking against the doctrine of transubstantiation.

ARTICLES, THE THIRTY-NINE, of the Church of England: articles of religion agreed upon by the archbishops and bishops of both provinces and the whole clergy in the convocation at London, 4th year of Elizabeth, 1562, under Abp. Parker. To have a clear view of the history of these important articles, we must go back to the promulgation of the original ones, forty-two in number, in the reign of Edward VI. The council appointed in the will of Henry VIII. to conduct the government during the king's minority, was for the most part favorably disposed towards the Reformed opinions, and the management of church affairs devolved almost entirely upon Abp. *Cranmer*. In the year 1549, an act of parliament was



## ARTICLES, THE THIRTY-NINE.

passed, empowering the king to appoint a commission of 32 persons, to make ecclesiastical laws. Under this act, a commission of 8 bishops, 8 other divines, 8 civilians, and 8 lawyers (among whom were Cranmer, Ridley, Hooper, Coverdale, Scory, Peter Martyr, Justice Hales, etc.) was appointed, 1551, and one of its first acts was to draw up a code of articles of faith. These were forty-two in number, and were set forth by the king's authority in 1553. Strype and Burnet make it appear that these forty-two articles were agreed upon in the convocation that was sitting in 1552, but this was not the fact. Fuller, speaking in his quaint way of this convocation, declares that it had 'no commission from the king to meddle with church business, and,' he adds, 'every convocation in itself is born deaf and dumb, so that it can neither hear nor speak concerning complaints in religion till first *Ephphatha*, "Be thou opened," be pronounced unto it by royal authority. However,' he continues, 'this barren convocation is entitled the parent of those forty-two articles which are printed with this title, *Articuli de quibus in Synodo Londinensi 1552 A.D. inter Episcopos et alios convenerat.*' To these articles was prefixed the Catechism, and there is no doubt that Cranmer had the principal hand in their composition; for he owned before Queen Mary's commission that they were his doing. But immediately after their publication, Edward died, and one of the first acts of the convocation summoned with the parliament in the first year of Queen Mary was to declare that these forty-two articles had not been set forth by the agreement of that house, and that they did not agree thereto. In 1558, Elizabeth succeeded her sister. In 1559, Parker was installed in the see of Canterbury, and immediately the other vacant sees were filled. And now came a fresh opportunity of drawing up some articles of faith which might serve as a test of orthodoxy in the Reformed Church. Parker applied himself to this work, and for the purpose revised the forty-two articles of King Edward, rejecting four of them entirely, and introducing four new ones, viz., the 5th, 12th, 29th, and 30th as they now stand, and altering more or less seventeen others. This draft Parker laid before the convocation which met in 1562, by which further alterations were made; and the 39th, 40th, and 42d of King Edward's, which treated of the resurrection, the intermediate state, and the doctrine of the final salvation of all men, were finally rejected. The 41st of King Edward's, which condemned the Millenarians, was one of the four which Parker omitted. Thus the articles were reduced to thirty-nine. They were drawn up and ratified in Latin, but when they were printed, both in Latin and English, the 29th was omitted, and so the number was further reduced to thirty-eight. From these thirty-eight there was a further omission, viz., of the first half of the 20th article, which declares that 'the church hath power to decree rites and ceremonies, and hath authority in controversies of faith.' As all the records of convocation perished in the great fire of 1666, it is very difficult to ascertain how the omissions arose. However, in 1571, the

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articles once more underwent revision. Abp. Parker and Bp. Jewel made a few slight alterations, and the 29th being restored, the convocation which was then sitting ratified them both in Latin and English, and an act of parliament was passed in that year compelling the clergy to subscribe 'such of them as only concern the confession of the true Christian faith, and the doctrine of the Sacraments.' There still, however, remained some difficulty as to which was the authorized copy, some of the copies being printed with, and others without, the disputed clause of the 20th; but this was finally settled by the canons passed in the convocation of 1604, which left the thirty-nine articles as they now stand. 'His Majesty's Declaration,' which precedes them, and directs that they shall be interpreted 'in their literal and grammatical sense,' was prefixed by Charles I. in 1628.

It is interesting to know from what other sources the thirty-nine articles are derived. Some of them, as the 1st, 2d, 25th, and 31st, agree not only in their doctrine, but in most of their wording, with the Confession of Augsburg. The 9th and 16th are clearly due to the same source. Some of them, as the 19th, 20th, 25th, and 34th, resemble, both in doctrine and verbally, certain articles drawn up by a commission appointed by Henry VIII., and annotated by the king's own hand. The 11th article on justification, is ascribed to Cranmer, but the latter part of it only existed in the articles of 1552. The 17th, on predestination, may be traced to the writings of Luther and Melancthon.

The thirty-nine articles have been described as 'containing a whole body of divinity.' This can hardly be maintained. They contain, however, what the Church of England holds to be a fair scriptural account of the leading doctrines of Christianity, together with a condemnation of what she considers to be the principal errors of the Church of Rome, and of certain Protestant sects. As far as they go (and there are many things unnoticed by them) they are a legal definition of the doctrines of the Church of England and Ireland; though it is to the *Book of Common Prayer* that members of that communion look for the genuine expression of her faith. They were adopted by the convocation of the Irish Church in 1635, and by the Scotch Episcopal Church at the close of the 18th c. Corpus Christi College, Cambridge, contains the only copies of the A. in manuscript or print that are of any authority. Among them are the Latin manuscript of the A. of 1562, and the English manuscript of the A. of 1571, each with the signatures of the archbishops and bishops who subscribed them. See *An Account of the Thirty-nine Articles*, by Dr. Lamb.

For other 'Articles,' see LAMBETH: PERTH: SCHMALKALD.

ARTICULATA, *ár-tík'û-lā'tă* (or ARTICULATED ANIMALS): one of the great primary divisions of the animal kingdom, according to the system of Cuvier (see ZOOLOGY), and including those animals of which the body is distinctly segmented—the higher worms, as well as Insects, Crustaceans,



## ARTICULATE SOUNDS—ARTICULITE.

Arachnids, and Myriapods. The four latter groups were separated from the Annelida (q.v., and see also the article WORMS) by Von Siebold, on account of their possession of hollow jointed limbs, into a separate sub-kingdom, Arthropoda. The term Arthropoda is now largely used instead of Articulata.

ARTHIROPODA.—In this great division of the animal kingdom, the body consists of a usually definite number of segments, each bearing a pair of hollow and almost always jointed limbs, into which the body muscles proceed.

In all cases, the epidermis gives rise to an external horny layer of *Chitine* (q.v.), which usually attains considerable strength and thickness, and in Crustaceans is further strengthened by impregnation with salts of lime. The segments of the body and their corresponding appendages exhibit considerable differentiation, especially in the anterior region of the body, where also some or many segments may completely coalesce, their appendages also becoming extraordinarily modified for various functions; so that it requires the combined research of both the embryologist and the comparative anatomist, to analyze the organism into its constituent parts. The nervous system is a ventral chain of ganglia united by longitudinal and transverse commissures, and one pair of ganglia is developed for each segment, although some of these also coalesce more or less completely in the adult.

The A. divide naturally into two great alliances—the water-breathers, or *Branchiata* (see GILLS), and the air-breathers, or *Tracheata* (see RESPIRATION); the former including the *Crustacea*, and the latter the *Prototracheata* or *Peripatidea*, the *Myriapoda*, the *Arachnida*, and the *Insecta*. For the relation of the Arthropoda to other groups, see ZOOLOGY. Also, see CRUSTACEA: MYRIAPODA: ARACHNIDA: and INSECTS: the group *Peripatidea* having been most recently established as a distinct class. The *Peripatidea* are represented by a single genus, *Peripatus*, which appears, both from its extreme simplicity of structure and its wide distribution (S. Amer. and the Antilles, S. Africa, New Zealand) to be of very remote antiquity. At first supposed to belong to a mere subclass of Annelids, its arthropod character was not established till the voyage of the *Challenger*, when the discovery was made that it has distinct tracheæ, which open irregularly over the surface of the body, instead of being disposed in regular relation to the segments. Its segments and their appended limbs, its visceral anatomy, and its development are all distinctly arthropodan, and show that we have here almost the most primitive imaginable form of the Tracheate Arthropoda. *Peripatus* is about 1½ inches long, inhabits decayed wood, and has the curious and suggestive habit of spinning a web over itself when alarmed. (See Moseley, *Notes of a Naturalist in the Challenger*).

ARTICULATE SOUNDS: see LETTERS.

ARTICULATION: see JOINTS.

ARTICULITE, *âr-tîk'û-lî'* [L. *articulus*, a little joint: Eng. suf. *-ite*]: a mineral, called also itacolumite, a variety of quartz (q.v.).

## ARTIFICIAL LIMBS.

**ARTIFICIAL LIMBS:** known only since the time of Ambrose Paré, whose *Œuvres de Chirurgie* were pub. 1575—with the exception that there is recorded the celebrated artificial hand of the German knight, Götz von Berlichingen\*—who lived in the early part of the 16th c. (1513), and who was named *The Iron-handed*—which weighed three pounds, was so constructed as to grasp a sword or lance, and was invented by a mechanic of Nuremberg. The twelfth chapter of Ambrose Paré's volume, translated by Thomas Johnson, 1605, shows 'by

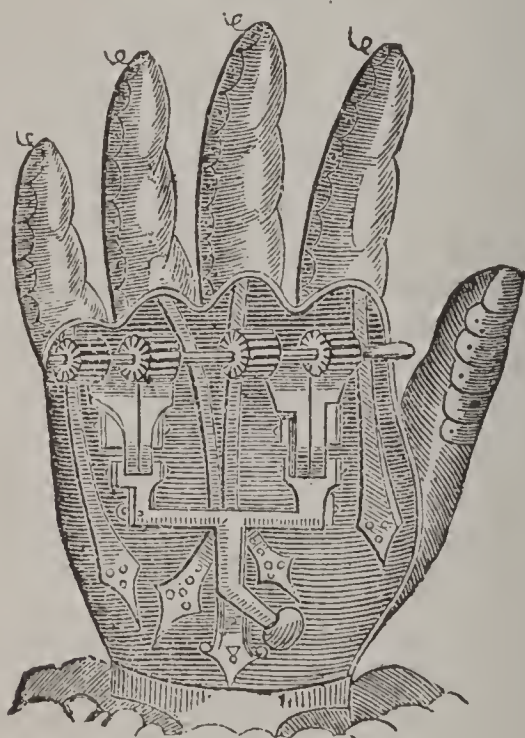


Fig. 1.

what means arms, legs, and hands may be made by art, and placed instead of the natural arms, legs, and hands that are cut off or lost.' The accompanying figures are copies of his drawings of 'an hand made artificially of iron' (Fig. 1), and of 'the form of an arm made of iron verie artificially' (Fig. 2). He also gives a drawing of 'a wooden leg made for a poor man' (Fig. 3), which is simply the common wooden leg with bucket receptacle still in use. No improvements worthy of record were made from the time of Ambrose Paré to the beginning of the present c., when Baillif of Berlin constructed a hand which did not exceed a pound in weight, and in which the fingers,

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\* The iron hand of this knight, who has been immortalized by Goethe, is preserved at Jaxthausen, near Heilbronn, and a duplicate of it is in the Schloss at Erbach, in the Odenwald. It is stated in Scott's *Border Antiquities*, vol. ii., p. 206, that the family of Clephane of Carslogie 'have been in possession from time immemorial of a hand made in the exact representation of that of a man, curiously formed of steel,' which was conferred by one of the kings of Scotland on a laird of Carslogie, who had lost his hand in the service of his country.—See *Notes and Queries* for 1867, July 17, p. 35.



## ARTIFICIAL LIMBS.

without the aid of the natural hand, not only exercised the movements of flexion and extension, but could be closed upon and retain light objects, such as a hat, and even a pen. 'Artificial hands,' says Mr. Heather Bigg, 'are now constructed, by means of which a pin may be picked up from the ground, a glass raised to the lips, food carried to the mouth, and a sword drawn from the scabbard, and held with considerable firmness; while a com-

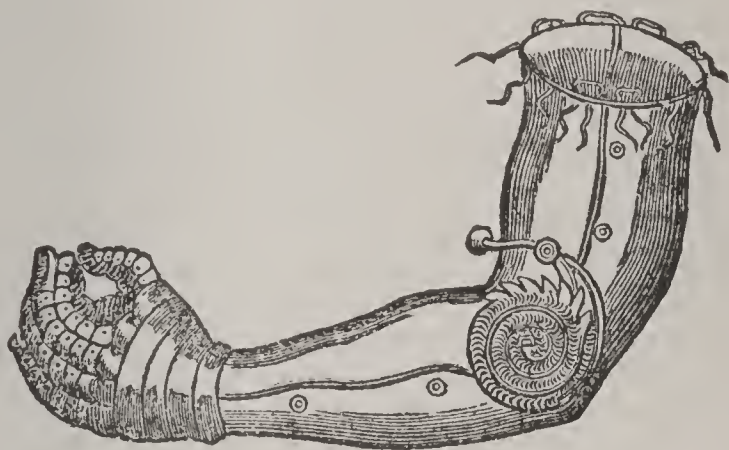


Fig. 2.

bined arm and hand is fabricated, which is equal to the ordinary requirements of histrionic declamation.'—*Orthopraxy*, 1865, p. 157. The utility of an artificial arm depends much on the nature of the stump. A stump above the elbow is best suited for an arm when it gradually tapers to its lowest end, and terminates in a rounded surface. When an arm is removed at the shoulder-joint, and there is no stump, an artificial arm can still be fixed in its proper place by means of a corset. In amputation below the elbow-joint, the best stump is one which includes about two-thirds of the fore-arm; while a stump formed by amputation at the wrist is very unsatisfactory. The simplest form of artificial arm intended to be attached to a stump terminating above the elbow, 'consists of a leathern sheath accurately fitted to the upper part of the stump. The lower end of the sheath is furnished with a wooden block and metal screw-plate, to which can be attached a fork for holding meat, a knife for cutting food, or a hook for carrying a weight.'—*Op. cit.* p. 160. The arm should be so carried as to represent the position of the natural arm when at rest. It is retained in its position by shoulder and breast straps, and forms a light, useful, and inexpensive substitute for the lost member. More complicated, and therefore more expensive, pieces of apparatus are made, in which motion is given to the fingers, a lateral action of the thumb is obtained, and the wrist movements are partially imitated; and a degree of natural softness is given to the hand by a covering of gutta-percha and India rubber. Such a hand, says Mr. Bigg, is often more symmetrical in aspect than the natural hand, but it possesses no efficient grasping power. Hence

## ARTIFICIAL LIMBS.

provision has to be made for attaching various instruments to its palm, such as special hooks, which can be removed at pleasure, for driving, shooting, etc.; apparatus for using the knife and the fork, for grasping the pen, etc.; indeed, the number and variety of instruments capable of being applied to an artificial hand are very great. Nothing has tended so much to the very highest development of artificial arms and hands, as an accident which happened more than a quarter of a century ago to the celebrated French tenor, M. Roger, who lost his right arm above the elbow. It was necessary, for his future appearance on the stage, that he should have an artificial limb, which would serve the purposes of histrionic action, and permit him to grasp a sword and draw it from its scabbard. Such a contrivance was invented in 1845 by Van Petersen, a Prussian mechanician, and the French Academy of Sciences commissioned MM. Gambey, Rayer, Velpeau, and Magendie to report upon it. For a history of the nature of the limb, the reader is referred to the report, which appeared in the *Comptes Rendus* for that date, or to Mr. Bigg's *Orthopraxy*, pp. 176-181. The apparatus, which weighs less than 18 ounces, was tested upon a soldier who had lost both arms. By its aid he was enabled to pick up a pen, take hold of a leaf of paper, etc.; and the old man's joy during the experiment was so great, that the Academy presented him with a pair of these arms. Van Petersen's conceptions have been extended and improved by Messrs. Charriere, the celebrated surgical mechanics of Paris, aided by M. Huguier, the well-known surgeon. A very marvellous arm has also been almost simultaneously constructed by M. Bechard, which, 'by means of a single point of traction, placed in pronation, executes first the movement of supination, next in succession the extension of the fingers and abduction of the thumb: the hand is then wide open.'—Bigg, *op. cit.* p. 190.

Artificial legs having fewer requirements to perform than artificial arms, are comparatively simple in structure. We borrow the description of our figure of the ordinary bucket leg in common use among the poorer classes from Mr. Bigg's *Orthopraxy*. 'It consists of a hollow sheath or bucket, A, accurately conformed to the shape of the stump, and having—in lieu of the more symmetric proportions of the artificial leg—a "pin," B, placed at its lower end to insure connection between it and the ground. This form of leg is strongly to be recommended when expense is to be avoided, as it really fulfils all the conditions excepting external similitude embraced by a better piece of mechanism. It is likewise occasionally employed with

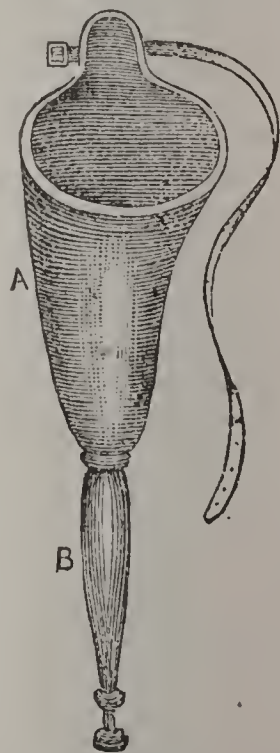


Fig. 3.



## ARTIFICIAL LIMBS.

benefit by those patients who, from lack of confidence, prefer learning the use of an artificial leg by first practicing with the commonest substitute.' As, when the body rests on a single leg, the centre of gravity passes through the tuberosity of the ischium, it is essential that the bucket should be so made as to have its sole point of bearing against this part of the pelvis.

Of the more complicated forms of artificial leg three are especially popular. The first of these is of English origin, and owing to its having been adopted by the late Marquis of Anglesea, is known as the *Anglesea leg*. For a description of it, the reader is referred to Gray's work on *Artificial Limbs*, one of the firm of Grays having been the constructor of the legs used by the marquis. This was for a long time *the* fashionable artificial leg. The second leg worthy of notice is that invented by an American named Palmer, and called the *Palmer leg*. From its lightness and the greater ease of walking with it, it has long superseded the Anglesea leg in America. In the third of these legs, also invented in America, and known as *Dr. Bly's leg*, the principal faults of the two other legs have been completely overcome. The advantages of this leg are thus summed up by Mr. Bigg, who has fully described and figured its mechanism: (1) Adaptation to all amputations either above or below the knee. (2) Rotation and lateral action of the ankle-joint. (3) Power on the part of the patient to walk with ease on any surface, however irregular, as, owing to the motion of the ankle-joint, the sole of the foot readily accommodates itself to the unevenness of the ground, which is an advantage never before possessed by any artificial limb. (4) The ankle-joint is rendered perfectly indestructible by ordinary wear, owing to its centre being composed of a glass ball resting in a cup of vulcanite; thus it never gets out of repair, as the Anglesea leg frequently does, and the original cost is almost the only cost. (5) The action of the ankle-joint is created by five tendons, arranged in accordance with the position assigned to them in a natural leg. These tendons are capable of being rendered tight or loose in a few instants, so that the wearer of the leg has the power of adjusting with precision the exact degree of tension from which he finds the greatest comfort in walking, and also of giving the foot any position most pleasing to the eye. (6) There is a self-acting spring in the knee-joint, urging the leg forward in walking, and imparting automatic motion, thus avoiding the least trouble to the patient. (7) The whole is covered by a beautiful flesh-colored enamel, which can be washed with soap and water. (8) At the knee-joint there is a mechanical arrangement representing the crucial ligaments, and affording natural action to that articulation by which all shock to the stump in walking is avoided. Hermann's artificial limb is still more highly approved by many, as affording more support when the knee is bent. See Max Schede's work on Amputation, the *System of Surgery* by Holmes and Hulke (3d ed. 1883), or other surgical authority.

## ARTIGA—ARTIGAS.

In cases of arrested development of the lower limbs, short-legged persons may be made of the ordinary height by the use of two artificial feet placed twelve or more inches below the true feet, and attached to the legs by means of metallic rods, jointed at the knee and ankle.

Other parts, not entitled to be called limbs, can also be replaced by mechanical art—such as the nose, lips, ears, palate, cheek, and eye. In the present advanced state of plastic surgery, deficiencies of the nose, lips, and palate can usually be remedied by an operation; cases, however, may occur where an artificial organ is required. Artificial ears are moulded of silver, painted the natural color, and fixed in their place by a spring over the vertex of the head. Loss of an eye causes sad disfigurement; but the artificial eyes of Boissonneau (see his *Renseignements Généraux sur les Yeux Artificiels*) can hardly be detected.

ARTIGA, *ar-tě'gá*, FRANCISCO DE: b. at Huesca abt. the middle of the 17th c., d. 1711: Spanish landscape-painter, engraver, and author. He taught at Huesca in a chair of mathematics endowed by himself, and wrote on mathematics and other subjects.

ARTIGAS, *ar-tě'gás*, JUAN, or FERNANDO JOSÉ: abt. 1760–1826; b. Montevideo: S. American general and dictator. He began his career in Buenos Ayres in the insurrection against Spain, and afterwards joined the republican army besieging the Brazilians in Montevideo, but quarrelled with the director, and was outlawed. He then organized a band of *gauchos*, defeated the Buenos Ayres troops, and established himself as dictator in Montevideo. Later he met with a series of defeats, and died in exile.



## ARTILLERY.

**ARTILLERY**, n. *âr-tîl' lër-î* [F. *artillerie*, engines of war—from mid. L. *artillāria*, any kind of warlike weapons or machines; *artillātor*, a maker of machines—from *artem*, in mid. L. sense, 'art of war']: weapons of war of any kind; cannon; great guns, etc. **ARTILLERYMAN**, the man who assists to manage a cannon. **ARTIL'LERIST**, n. one skilled in gunnery.

**ARTILLERY**: sometimes meaning large cannon or ordnance of every kind; sometimes including the shot and shells; sometimes applying to the soldiers who manage the cannon. For large pieces of ordnance, as a class, see **CANNON**: for specialties see **CARRONADE**: **HOWITZER**: **GUN**: **MORTAR**: etc.: and in some cases the names of the inventors, as **ARMSTRONG GUN**: **LANCASTER GUN**: etc.. See also **FIREARMS**: **RIFLED ARMS**: **GUNNERY**: **SHELLS**: **SHOT**. The term *Equipment of A.* is applied to a combination of men, *matériel*, and horses, suitable for coast-defenses, sieges, or the arming of fortified posts. There are several kinds of equipments of *light A.*, under the names of horse, field, rocket, mountain, and reserve; and others of *heavy A.*, for the attack and defense of coasts and fortified places. These various equipments are generally divided into smaller collections called *Batteries* (q.v.), for more easy control and maneuvering. *Park of A.* is a collective name given to the whole of the guns, carriages, ammunition, and other appurtenances essential to the working of field or siege A.

*Artillery Corps.*—Before the invention of gunpowder, the larger projectile weapons, sometimes called *engines of war*, sometimes *artillery*, were worked by rough soldiers, who needed no particular apprenticeship to that art. When, however, large balls of iron came to be propelled by the tremendous force of gunpowder, a great revolution gradually took place, though garrison-guns and siege-guns were improved more rapidly than field-guns. Nevertheless, field-guns changed the whole aspect of military tactics; for it became necessary that an army should form in order of battle at a much greater distance from the enemy than in older times. And as cannon were made more rapidly movable, so did tactics vary. Gradually, a body of men was set apart to study the force and action of gunpowder, the flight and range of projectiles, the weight and strength of cannon, and the maneuvering of heavy masses. The French were the first to make these researches; after them, the English; and later, the Germans. During the Thirty Years' War, an important step was taken in Germany—that of including the artillerymen, who were till then a sort of guild, as a component in the regular army. Gustavus Adolphus in Sweden, Frederick II. in Prussia, and Napoleon I. in France, all attached a very high degree of importance to the A. as an arm of the service. After the great wars in the beginning of the present century, nearly all the states of Europe formally recognized the A. as the third great branch of military service (next after the infantry and cavalry); indeed, in almost all present armies, it takes practically the first place.

## ARTIODACTYLA.

*Field-A.*, or *Light A.*, is designed for service in the field, and comprises flying A., foot A., horse A., and mountain A. Flying A., as its name indicates, is intended to execute very rapid evolutions, the guns and the gunners, with the ammunition chests, etc., being moved from one position to another in the field by horses. Foot A. is served by artillerymen on foot, and accompanies bodies of infantry. Horse-A. consists of light guns or machine guns; the gunners are mounted while executing manœuvres. Mountain-A. comprises light guns of small calibre, which are mounted on light carriages or borne on the backs of pack animals. The field-A. of an army or military establishment is divided into *batteries*, each consisting of 4-8 guns, with a certain complement of wagons, men, and general outfit. For an army in the field, 3 pieces of A. to 1,000 infantry is the approved proportion. *Heavy A.* comprises sea-coast A. and siege-A. The guns of the sea-coast A. service are of the heaviest kind and are mounted in permanent works. Siege-A., consisting of heavy guns mounted on carriages for transportation, accompanies armies in their operations: it is employed to defend field works or to reduce the works of an enemy.

In the U. S. army, the regimental organizations of the A. arm was discontinued by Act of Congress, 1901, Feb. 2, which designated the arm as the A. Corps. The uniform has red facings and trimmings.—The A. service of France had (1890) 19 regts. mounted A. of 12 batteries each, every regt. having 77 officers, 1,274 men, 767 horses; 19 other regts., with 9 batteries mounted and 3 batteries of horse-A., the strength of these regts. being 77 officers, 1,280 men, 845 horses; 4 mounted batteries, each with 4 officers, 153 men, 132 horses; 20 batteries of mountain A., each consisting of 4 officers, 238 men, 167 horses; total 480 field batteries, 2,060 pieces. The fortress A. of France comprised 16 battalions of 6 batteries each, a battery being 4 officers, 152 men, 6 horses; and there are 4 batteries in Algeria—total 100 batteries.—The field-A. of the German empire comprised (1890) 38 regts. having 1,984 officers, 40,929 men, 22,457 horses, 1,538 guns. The foot A. had 14 regts. and 3 battalions, 738 officers, 17,244 men.

*Artillery Schools.*—The headquarters for A. instruction in England are at Woolwich. France has seven A. schools. In Prussia, the A. and engineer schools are combined.

The School of Artillery for the U. S. army is at Fort Monroe. A col. of the artillery is in command, assisted by a lieut.col. and a major. The course of study occupies two years, and includes both theory and practice.

ARTIODACTYLA, n. plu. *âr'tî-ô-dăk'tî-lă* [Gr. *ar'tiōs*, even; *dak'tulos*, a finger, a toe]: a division of the hoofed quadrupeds in which each foot has an even number of toes, as two or four. The great mammalian order Ungulata (see MAMMALIA: UNGULATA) is divided into two groups; first, the *Perissodactyla*, including the horse, tapir and rhinoceros, besides a multitude of extinct forms, and distinguished by the third digit of each limb being sym-



## ARTIODACTYLA.

metrical in itself, by the presence of an odd number of digits on the hind-foot, by the number of dorso-lumbar vertebræ being at least twenty-two, and so on; while the second sub-order, the *Artiodactyla*, have the third digit, unsymmetrical in itself, but forming a symmetrical pair with the fourth digit. While the hind-foot bears an even number of digits, the number of dorso-lumbar vertebræ never reaches twenty-two, and rarely exceeds nineteen. Numerous minor osteological differences exist between the two sub-orders, which broadly correspond to the ancient divisions of solid-hoofed and cloven-hoofed respectively. See Foot.

The A. divide into two groups—the *Non-ruminantia* and the *Ruminantia*. The former have usually more than one pair of upper incisors, and the molars have a more or less tuberculated pattern, whence they are frequently termed *Bunodonta*. The metatarsal bones remain separate, and there are no horns. The stomach has rarely more than two divisions. The *Non-ruminantia* include two existing families, *Suidæ* and *Hippopotamidæ*. The *Suidæ* (pigs) have the skin moderately thick and hairy; the third and fourth toes are much longer than the second and fifth. The teeth are frequently as many as forty-four, and the molars are multituberculate. The *Hippopotamidæ* have the skin extremely thick, with scanty hairs; the head, body, and limbs extremely massive; and the four toes resting on the ground. The *Ruminantia* have never more than one pair of upper incisors. In the lower jaw, the canines closely resemble and are situated beside the six incisors, which thus seem to have increased to eight. The molars bear a double series of crescentic ridges, whence the name *Selenodonta* is frequently applied to the ruminant group. The stomach has at fewest three, and usually four divisions. Thus in the sheep or ox, the cardiac portion of the stomach is differentiated into the enormous *rumen*, or paunch, and the *reticulum*, or honey-comb stomach, with which it communicates. After the fodder has been chewed again, it passes readily into the third division, the *psalterium*, or manyplies, which acts as a filter, and allows only the finely-comminuted portions of the food to enter the highly glandular *abomasum*, or rennet stomach, in which gastric juice is secreted, and proteid digestion goes on.

The existing groups of ruminants are the *Tragulidæ*, the *Cotylophora*, and the *Camelidæ*. The *Tragulidæ* (sometimes erroneously termed musk-deer) are the least differentiated forms, and show interesting affinities to the non-ruminants. The *Cotylophora*, including the ox and deer tribes (*Bovidæ* and *Cervidæ*), are the central family, broadly distinguished by the cotyledonary placenta and the structure of their horns; those of the *Cervidæ* being naked, deciduous, and annually renewed processes of the frontal bones; while those of most *Bovidæ* (sheep, antelopes, oxen, buffaloes) are non-deciduous processes of the frontal bone, covered by the thickened and hardened epidermis known as horn. But

## ARTISAN—ARTOCARPACEÆ.

in one sub-family, the giraffes, the horns arise as separate ossifications, and are covered by hairy skin.

The third family, the *Camelidæ*, are aberrant ruminants. They walk on broad integumentary cushions, developed below the phalanges of the third and fourth toes, which alone are developed, the nails not forming hoofs. Large pointed canines are present in each jaw. The stomach has a characteristic structure. The placenta is diffused. There are only two existing groups—the Camels of the old world, and the Llamas of the new.

ARTIODACTYLE, a. -tīl: having an even number of toes.

See RUMINANTIA: BOVIDÆ: DEER: also HOG: HIPPO-  
POTAMUS: ANTELOPE: SHEEP: OX: BUFFALO: GIRAFFE:  
CAMEL: LLAMA: ALPACA: etc.

AR'TISAN, n : see under ART.

ARTIST, n. *âr'tîst* [L. *artem*. an art]: one who exercises any of the fine arts or crafts, particularly that of a painter, a sculptor, an architect, or a photographer. ARTISTE, n. *âr-tîst'* [F. *artiste*, an artist—from I.]: a female painter, musician, singer, or dancer. ARTISTIC, a. *âr-tîs'tîk*, or ARTIS'TICAL, a. -tî-kâl, of an artist; according to a high degree of art. ARTIS'TICALLY, ad. -lî.

ARTOCARPACEÆ, *âr'tō-kâr-pâ'sè ē*: n. ord. of monochlamydeous exogens, of which the Bread-fruit (*Artocarpus incisa*) is the type; nearly allied to that of *Moraceæ* (mulberries, figs, etc.), and, like it, by many botanists regarded as a sub-order of *Urticaceæ* (nettles, etc.). The distinction be-



Bread-fruit (*A. incisa*).

tween Artocarpaceæ and Moraceæ lies chiefly in the straight embryo and large cotyledons of the former. The fruit is often a *sorosis* (a single succulent fruit formed of the aggregated ovaries of a whole head of flowers), as in Bread-fruit (q.v.). There are upwards of fifty known species,



## ARTOCARPUS—ARTS.

natives exclusively of the tropics. The milky juice of some yields CAOUTCHOUC (q.v.); and that of a few species is so bland as to be used as a substitute for milk. See COW-TREE. The juice of others is, however, very poisonous, as that of *Antiaris toxicaria*, the Antjar poison, one of the poisons called Upas by the Javanese. The fruits are wholesome; the importance of the Bread-fruit in the South Sea Islands is well known; and the seeds of the *Musanga* of the Gold Coast of Africa, and of *Brosimum alicastrum* in the West Indies, are eaten as nuts. The fibrous bark of the Bread-fruit tree is made into cloth; its wood is used for building, its male catkins for tinder; its leaves serve as substitutes for table-cloths and wrapping-papers, and its milky juice for bird-lime. The bark of *Antiaris saccolora* is used in Western India for making sacks, which are formed by cutting a branch of the dimensions of the sack wanted, and simply turning back and drawing off the bark after it has been soaked and beaten, the wood being sawn off so as to leave a little portion to form the bottom of the sack. The fibrous bark of *Cecropia peltata*, or Trum-petwood, is used for cordage. The stem and branches are hollow, and are used for wind instruments. The wood of some species is valuable, such as *Letter-wood* (q.v.).

ARTOCARPUS, n. *âr'tô-kâr'pûs* [Gr. *artos*, bread; *karpos*, fruit]: the bread-fruit tree of the S. Sea Islands; the *Artocar'pus incisa*.

ARTOIS, *âr-twá'*: formerly a prov. of France, bounded by Flanders and Picardy, and almost corresponding with the modern department of *Pas-de-Calais* (q.v.). The cap. of A. was Arras. Louis IX., in 1239, made A. a county, and gave it to his brother Robert, who was succeeded by his son, Robert II., surnamed Posthumous, d. 1302. Afterwards it passed into the hands of Flanders and Burgundy, but was ceded to France by treaties in 1659 and '78. Charles X., in his early life, and also after his abdication, was known by the title of Count d'Artois.

ARTOTYRITE, n. *âr-tô-tî'rît* [Gr. *artos*, bread; *tyros*, cheese]: one of a sect in the primitive church who celebrated the Lord's Supper with bread and cheese, on the ground that the first oblations of men were not only the fruits of the earth, but their flocks (Gen. iv. 3, 4).

ARTS, DEGREES IN: ranks, or stages, in learning, gained by a student, and officially certified to by a proper collegiate or university faculty. The term 'Arts,' or 'Liberal Arts,' as technically applied to certain studies, came into use during the middle ages, and on the establishment of universities, the term 'Faculty of Arts' denoted those who devoted themselves to Science and Philosophy, as distinguished from the faculty of Theology, and afterwards of Medicine and Law. The number of 'Arts' embraced in the full mediæval course of learning was seven; Grammar, Logic, Rhetoric (constituting the *Trivium*), Music, Arithmetic, Geometry, and Rhetoric (the *Quadrivium*). The terms Master and Doctor were originally applied synonymously to any person engaged in teaching. In process of

## ARTS.

time, the one was restricted to the liberal arts, the other to Divinity, Law, and Medicine. When regulations were established to prevent unqualified persons from teaching, and an initiatory stage of discipline was prescribed, these terms became significant of a certain rank, and of the possession of certain powers, and were called *gradus*, 'steps' or 'degrees.' The passing of the initiatory stage, said to have been instituted by Gregory IX. (1227-41), conferred the title of *bachelor* (q.v.), and an additional course of discipline and examination was necessary to obtaining that of *master*. The title of Master of Arts originally implied the right, and even the duty, of publicly teaching some of the branches included in the faculty of Arts; a custom which is still retained to some extent in the German universities, but has fallen into disuse in Britain, France, and America, where the title is nearly honorary. See DEGREE LL.A. (Literate in Arts) is a minor degree, recently instituted at some of the Scottish universities, and at St. Andrews is open to women. The degrees of Bachelor and Doctor of Science are granted for eminence in subjects some of which belong to the Faculty of Arts.



## ART UNIONS—ARTVIN.

**ART UNIONS:** institutions for the promotion of public interest in fine art, and for providing opportunities for disposal by sale of the approved works of artists. They are intended to supply the place of that encouragement which, at an earlier period, artists received from princes and prelates.

The origin of A. U., claimed by the Germans, seems to belong to the French in the days of the first Napoleon. From France they passed over into Belgium, where they established themselves even in the less important towns, ten years before they were introduced into Germany. The Art Union of Mechlin dates from 1812; the Art Union (*Kunstverein*) of Munich, established 1823, became the model of most of those which afterward arose. The most important was established at Düsseldorf, 1829, for the Rhine provinces and Westphalia, and has promoted the execution of works of art of the highest class; expending on such works in 20 years (1849-69) more than \$200,000, and placing paintings on a large scale in public buildings. The Bohemian Assoc. at Prague, and those of Berlin and Cologne have wrought zealously in the same high line—the latter urging on the completion of one of the greatest architectural monuments of northern Europe—the cathedral of Cologne. The establishment of permanent galleries of art in the cities to which they respectively belong is also one of the higher objects of A. U.—The first A. U. in Britain was established at Edinburgh 1834.

The American A. U., established in New York 1838, had close relations with the Düsseldorf Assoc., and rose in eleven years to an income of over \$95,000, and a membership of 18,960. It was discontinued 1849, under the state laws prohibiting lotteries. The lottery is certainly an unfortunate feature in the plan of the A. U., appealing for a noble end to ignoble motives.

As regards the constitution of A. U., the following arrangements are common to them all. Each member, in return for an annual contribution (in Britain, usually a guinea), receives an acknowledgment, which acts as his ticket in the lottery by which the works of art, purchased with the sum thus contributed, are distributed among the members. Generally, a fixed proportion of the contributions is retained and devoted to the preparation of an engraving, presented to those who have drawn blanks in the lottery. The engraving is usually executed by a local engraver, after a work of the local school intended to be patronized. The association further makes provision for an exhibition, either permanent, as at Munich, or annual, as in London and Edinburgh, consisting mainly of the works of local artists, though most associations now admit those of strangers.

**ARTVIN**, *ârt-vên*: town of Russian Armenia, on the Charuch; 34 m. s. of Batum. Pop. 8,000.

## ARUM.

**ARUM**, n. *ā'rŭm* [L. *ārum*; Gr. *aron*, supposed to be an Egyptian word]: a genus of spadicifloral endogens belonging to the nat. ord. *Araceæ* or *Aroideæ*. This order comprises herbaceous plants, some of which are stemless; shrubby plants, some of which are arborescent; and plants which climb by aerial roots, clinging to the trees of tropical forests. The leaves are sheathing at the base, convolute in bud, usually with branching veins. The flowers are male and female, naked, arranged upon a *spadix*, which is generally enclosed in a *spathe* (q.v.): the male flowers at the upper part of the spadix, and the female flowers at its base. The ovary is free. The fruit is succulent, the seeds pulpy, the embryo in the axis of fleshy or mealy albumen, with a lateral cleft in which the plumule lies; the albumen, however, is wanting in some plants of the order.—As thus



*Arum maculatum*.

a, leaves and root; b, spathe, with base of spadix exposed;  
c, fruit.

defined, this order contains almost 200 known species, natives chiefly of tropical countries; but some belong to colder climates. The N. Amer. representatives are Indian Turnip, Green Dragon, Arrow Arum, Water Arum, Skunk Cabbage, Golden Club, and Calamus.—The genus *A.* has a convolute spathe; the spadix naked at the point. In some species, a stench like that of carrion is produced during flowering, as well as a remarkable degree of heat. Plants are of course slightly warmer than the air around them, the heat being produced by the breaking up and oxidation of their protoplasm, and by the true respiration, in short, which goes on in all living tissues (see ANIMAL HEAT); but flowers, in general, are only  $1^{\circ}$ , or  $1\frac{1}{2}^{\circ}$ , warmer than the air, whereas the flowers of some of the *Arums*



and nearly allied plants are sensibly warm to the touch, and that of *A. cordifolium* has been found to have a heat of 121° F., while that of the air was only 66° F.—The only British species is *A. maculatum*, CUCKOW-PINT or WAKE-ROBIN, which is abundant in England and in most parts of Europe, growing chiefly in moist shady woods and under hedges. It has a tuberous perennial root; its leaves are all radical, on long stalks, strongly arrow-shaped, often spotted; the spathe greenish yellow, inclosing a rather short violet or brownish red spadix. It produces scarlet berries, 1–2 seeded, about the size of peas, clustered upon the spadix. The root has a burning acrid taste, which, however, it loses in drying or boiling. In a fresh state, it is a drastic purgative, too violent for medicinal use; indeed, it, as well as the leaves, is an active poison; yet a nourishing farina is prepared from it, after the acrid juice has been removed. This farina is a pure starch, and is known in England by the name of Portland Arrow-root. It was formerly prepared to a considerable extent in the isle of Portland, where also the tubers (corms) themselves are eaten by the country-people. A cosmetic called Cypress Powder is made from them in France, and they are used in Switzerland as a substitute for soap. They contain, indeed, a quantity of *Saponine*, to which their acidity is supposed to be owing. They lose great part of their acidity in drying, and were formerly used in medicine as a stimulant in impaired digestion, a diuretic in dropsies, and an expectorant in chest complaints. The plant is extensively cultivated in India for food.—*A. Indicum* is also much cultivated in Bengal for its esculent stems and small pendulous tubers.—Acridity in the juice, and the presence of an amylaceous substance of very nutritious quality, from which the acrid juice is easily separated, are characteristics of many plants of this order, particularly species of *Caladium* and *Colocasia*, much used for food in warm countries, under the names Cocco (q.v.) EDDOES, etc.—*Amorphophallus campanulatus* (*A. campanulatum*), called OL by the Bengalese, is very much cultivated in some parts of India for its roots (flat underground corms) which form a very important article of food; yet in a fresh state it is so acrid that it is employed as an external stimulant, and is also used as an emmenagogue. Other species of *Amorphophallus* are still more powerfully stimulant.—Two large species of *Arisæma*, another genus very closely allied to *A.*, were found by Dr. Hooker to afford food to the inhabitants of the Sikkim Himalaya at an elevation of upwards of 10,000 feet. Their tuberous roots are bruised by means of wooden pestles, and thrown into small pits with water, until the commencement of acetous fermentation, when the acidity is mostly dissipated; but the process is so imperfect that cases of injury from the poisonous juice are frequent. The tubers of *Arisæma atrorubens* (*A. triphyllum* of Linnæus), a native of the United States, and there known as Dragon-root and Indian Turnip, yield a pure white starch like that of *A. maculatum*. Their medicinal uses also are similar; they are employed as a stimulant of the secretions. The DRAGON-PLANT, *A. Drac-*

## ARUN—ARUNDEL.

*unculus*, a native of the s. of Europe, is not uncommon in gardens in Britain, although it has a carrion-like smell, and its emanations are apt to produce headache and other disagreeable effects. It has a singular appearance—straight stalks, three feet high, curiously spotted like the belly of a snake.—The peculiar acridity of the *Araceæ* is most remarkably displayed in the DUMB CANE (q.v.).

AR'UN: river rising in St. Leonard's Forest, in the middle of North Sussex, Eng. ; and after a course of 35 m., falling into the English Channel. A canal unites it with the Wey, a feeder of the Thames.

ARUNDEL, *ăr'un-dél*: small town 5 m. inland from the mouth of the Arun, in a tertiary and chalk district, on the s. side of the South Downs, in the s. w. of Sussex. It consists mainly of a very steep street rising from the right bank of the Arun to the summit of a hill crowned by a castle. The Arun is navigable for vessels of 150 tons up to the town. Bark and timber are the chief exports. A. was disfranchised by the Reform Bill of 1867. It is governed by a mayor, four aldermen, and twelve councilors. The castle, from its site, is a striking object, and was built soon after the Norman conquest. It is an oblong, including 5½ acres within its walls. It was laid in ruins during the civil wars of Charles I., but, being the baronial residence of the dukes of Norfolk, the late duke restored it to its former Gothic magnificence. The keep, containing the dungeon, is a circular Norman tower of imposing strength. Pop. (1881) 2,748; (1891) 2,644.

ARUNDEL, THOMAS, Archbishop of Canterbury in the reigns of Richard II., Henry IV., and Henry V.: 1353–1413, Feb. 20; second son of Robert Fitz-Alan, Earl of Arundel and Warren. He was first Archdeacon of Taunton, and at the early age of twenty-one he was, by the pope's appointment, consecrated Bishop of Ely. In 1388, he was, by the same authority, transferred to the archiepiscopal see of York. He was also for some years lord high chancellor of England. Having been banished the kingdom for taking a leading part in the first attempt which was made to deliver the nation from the oppression of Richard II., he was honorably received at Rome, and by Pope Boniface IX. nominated Abp. of St Andrews, with a promise of future preferment in England. In 1396 he was enthroned, with great pomp, Abp. of Canterbury. He was a bitter persecutor of the Lollards and followers of Wickliffe, and a chief instrument in procuring the horrible act for the burning of heretics (*De Hæretico Comburendo*), passed in the reign of Henry IV. He even carried his bigotry so far as to solicit from the pope a bull for digging up Wickliffe's bones, which was wisely refused him. He also procured a synodal constitution, which forbade the translation of the Scriptures into the vulgar tongue. Among others whom he caused to be convicted of heresy, and sentenced to the flames, was Lord Cobham, one of the principal patrons of the new sect, at the commencement of the reign of Henry V. Soon after, A. was seized with an inflammation in the throat, from which he died.



## ARUNDELIAN--ARVONIAN.

**ARUNDELIAN**, a. *ăr'ŭn-dĕl'yăn* [from the Earl of *Arundel*]: a name applied to certain ancient marbles presented by him to the University of Oxford.

**ARUNDEL MARBLES**: part of a collection of ancient sculptures, formed about the beginning of the 17th c. by Thomas Howard, Earl of Arundel, and presented, 1667, to the Univ. of Oxford, by his grandson, Henry Howard, afterwards Duke of Norfolk. The principal portion of it is the 'Parian Chronicle,' consisting of the fragments of an inscription in marble, supposed to have been executed in the island of Paros, about B.C. 263. In its perfect state, this inscription contained a chronological table of the principal events in Grecian history from the time of Cecrops (B.C. 1582), to the archonship of Diognetus (B.C. 264). The chronicle of the last nineteen years is lost, and the extant portion of the inscription is much corroded and defaced. This curious and interesting monument, the authenticity of which has been questioned and maintained with almost equal ingenuity and learning, was purchased for the Earl of Arundel, with many other relics of antiquity, at Smyrna, by Mr. (afterwards Sir William) Petty. The inscription, and all the other principal sculptures in the Oxford Collection, are to be found fully illustrated in the relative publications of Selden, Prideaux, Maittaire, and Chandler, under the various titles of *Marmora Arundelliana* and *M. Oxoniensia*.

The A. M. were part of the superb collection of works of art, for the supply of which, from the treasures of antiquity, the Earl of Arundel engaged the services of two distinguished men of letters, Evelyn and Petty. This collection, rivalling the galleries of princes, was unfortunately dispersed after his death, and many of its choicest treasures were lost sight of. His collection of sculpture alone, when entire, numbered 37 statues, 128 busts, and 250 inscribed marbles, besides altars, sarcophagi, fragments, and gems.

**ARUNDINACEOUS**, a. *ă-rŭn'dĭ-nă'shŭs* [L. *arundo*, a reed]: resembling or having the structure of reeds. **ARUNDINEOUS**, a. *ăr'ŭn-dĭn'ĭ-ŭs*, abounding with reeds. **ARUNDIFEROUS**, a. [L. *arundo*, a reed; *fero*, to bear]: reed-bearing; cane-bearing.

**ARUN'DO**: see **REED**.

**ARUSPICE**, n. *ă-rŭs'pĭs*, or **ARUSPEX**, n. *a-rŭs'peks* [L. *arus'pex* or *harus'pex*, a soothsayer—from *hĭra*, the intestine; *spĕciō*, I behold]: in *anc. Rome*, a diviner by the inspection of the entrails of beasts. **ARUSPICY**, n. *ă-rŭs'pĭ-sĭ*, the art of foretelling events by the inspection of the entrails of beasts slain in sacrifice.

**ARVIC'OLA**: see **VOLE**.

**ARVONIAN**, a. *ăr-vō'nĭ-an* [from *Arvonian*, the Roman name of a district of Wales]: pertaining to Arvonian. In *geol.*, the A. is a Pre-Cambrian formation found in Pembrokeshire, Carnarvonshire, and Anglesea. Dr. Hicks divides the Pre-Cambrian formation into *Dimetian*, *Arvonian*, and *Pebidian*. Each of these must have been many thousand feet in thickness, and their horizontal extension is very wide. The A. formation contains the quartz-felsites and porphyries, called *halleftlinta* by Törell, and *petrosilex rocks* by Hunt.

## ARYAN.

ARYAN, a. *ár'yān* or *ár'ī-ān* [Sans. *arya*, noble, of a good family: connected with *ar* in L. *arūrē*, to plow, and perhaps with Gael. *ghrian*, proud; *Arii*, a tribe of High Asia, mentioned in Herodotus]: name applied to the Indo-European or Indo-Germanic race, and to their languages. As applied to a race it includes a family of nations, consisting of two branches, geographically separated, an eastern and a western. The western branch comprehends the inhabitants of Europe, and their descendants in America and elsewhere, with the exception of the Turks, the Magyars of Hungary, and the Finns of Lapland (see EUROPE); the eastern comprehends the inhabitants of Armenia, of Persia, of Afghanistan, and of Northern Hindustan. See HINDUSTAN. The evidence on which a family relation has been established among these nations is that of language. Between Sanskrit (the mother of the modern Hindu dialects of Hindustan), Zend (the language of the ancient Persians), Greek (which is yet the language of Greece), Latin (the language of the Romans, and the mother of the modern Romanic languages, i.e., Italian, French, Spanish, Portuguese, Wallachian), Celtic (once the language of great part of Europe, now confined to Wales and parts of France, Ireland, and Scotland), Gothic (which may be taken as the ancient type of the Teutonic or Germanic languages—including English—and of the Scandinavian), and Slavonic (spoken in a variety of dialects all over European Russia and a great part of Austria), the researches of philology have within the present century established such affinities as can be accounted for only by supposing that the nations speaking them had a common origin. No one of these nations, whether existing or historical, can claim to be the parent nation of which the others are colonies. The relation among the languages mentioned is that of sisters—daughters of one mother, which perished, as it were, in giving them birth. No monuments of this mother-language have been preserved, nor have we any history or even tradition of the nation that spoke it. That such a people existed and spoke such a tongue is an inference of comparative philology, the process of reasoning being analogous to that followed in the kindred science of geology. The geologist, interpreting the inscriptions written by the finger of Nature upon the rock-tablets of the earth's strata, carries us back myriads of ages before man appeared on the scene at all, and enables us almost to see one formation laid above another, and one plant or animal succeed another. Now languages are to the ethnologist what strata are in geology; dead languages have been well called his fossils and petrifications. By skilful interpretation of their indications, aided by the light of all other available monuments, he is able to spell out, with more or less probability, the ethnical records of the past, and thus obtain a glimpse here and there into the gray cloud that rests over the dawn of the ages.

When these linguistic monuments are consulted as to the primitive seat of the Aryan nations, they point, as almost all ethnologists are agreed, to Central Asia, somewhere probably e. of the Caspian, and n. of the Hindu



## ARYAN.

Kush and Paropamisian Mountains. There, at a period long previous to all European history—while Europe was perhaps only a jungle, or, if inhabited at all, inhabited by tribes akin to the Finns, or perhaps to the American Indians—dwelt that mother-nation of which we have spoken. From this centre, in obedience to a law of movement which has continued to act through all history, successive migrations took place towards the n. w. The first swarm formed the Celts, who seem at one time to have occupied a great part of Europe; at a considerably later epoch came the ancestors of the Italians, the Greeks, and the Teutonic peoples. All these seem to have made their way to their new settlements through Persia and Asia Minor, crossing into Europe by the Hellespont, and partly, perhaps, between the Caspian and the Black Sea. The stream that formed the Slavonic nations is thought to have taken the route by the north of the Caspian. At a period subsequent to the last n. w. migration, the remnant of the primitive stock seems to have broken up; part poured southwards through the passes of the Himalaya and Hindu Kush into the Punjab, and became the dominant race in the valley of the Ganges; while the rest settled in Persia, and became the Medes and Persians of history.

It is from these eastern members that the whole family takes its name. In the most ancient Sanskrit writings (the Veda), the Hindus style themselves Aryans; and the name is preserved in the classic Arian, a tribe of ancient Persia, Aria, the modern Herat, and Ariana, the district. Ariana, or Airyana, is evidently an old Persian word, preserved in the modern native name of Persia, Airan or Iran. *Arya*, in Sanskrit, signifies 'excellent,' 'honorable,' being allied to the Greek *ari*(stos), the best; or to the root *ar* (Lat. *arare*, to plow), distinguishing tillers (*earers*) of the earth from the nomadic Turanians. French savans limit the word *Aryan* to the eastern section of the Indo-European stock.

It should be mentioned that Latham's theory of the European origin of the Aryans was supported by Spiegel and Benfey, and still finds asserters: see Penka, *Origines Arianae* (1883), and O. Schrader, *Sprachvergleichung und Urgeschichte*. Some of the European languages would therefore be a truer representation of the original Aryan tongue than the Indic ones. The original home of the Aryan would be Scandinavia, or the neighborhood of the Baltic; and the Aryan himself, a coarse nomad, without metals, clothed in skins. Following the other view, Max Müller has drawn a picture of the Aryan family while yet one and undivided, in which the state of thought, language, religion, and civilization is exhibited in a multitude of details. Where the same name for an object or notion is found used by the widely spread members of the family, it is justly inferred that that object or notion must have been familiar to them while yet resident together in the paternal home. It is in this way established, that among the primitive Aryans not only were the natural and primary family relations of father, mother, son, daughter,

## ARYTENOID—AS.

hallowed, but even the more conventional affinities of father-in-law, mother-in-law, sister-in-law; that to the organized family life there was superadded a state organization with rulers or kings; that the ox and the cow constituted the chief riches and means of subsistence; and that houses and towns were built.

One general observation made by Müller is so interesting that we take the liberty of quoting it entire. 'It should be observed,' he says, 'that most of the terms connected with chase and warfare differ in each of the Aryan dialects, while words connected with more peaceful occupations belong generally to the common heirloom of the Aryan language. The proper appreciation of this fact in its general bearing will show how a similar remark made by Niebuhr, with regard to Greek and Latin, requires a very different explanation from that which that great scholar, from his more restricted point of view, was able to give it. It will show that all the Aryan nations had led a long life of peace before they separated, and that their language acquired individuality and nationality as each colony started in search of new homes—new generations forming new terms connected with the warlike and adventurous life of their onward migrations. Hence it is that not only Greek and Latin, but all Aryan languages have their peaceful words in common; and hence it is that they all differ so strangely in their warlike expressions. Thus the domestic animals are generally known by the same name in England and in India, while the wild beasts have different names, even in Greek and Latin.'

In this mainly pastoral life, the more important of the primitive arts were known and exercised: fields were tilled; grain was raised and ground into meal; food was cooked and baked; cloth was woven and sewed into garments; and the use of the metals, even of iron, was known. The numbers as far as a hundred had been named, the decimal principle being followed. The name for a thousand had not come into requisition until after the dispersion, for it differs in the different Aryan tongues.

Finally, it was among the yet undivided Aryans, while abstract language did not yet exist, while every word was a metaphor, and the setting of the sun, for example, could only be expressed by his growing old and dying, that those stories of gods, heroes, and monsters originated, which, with more or less of variety, but still with a family likeness, formed the pagan mythology of every member of the group.

ARYTENOID, a. *a-rīt-ē'nōyd* [Gr. *arutai'na*, a pitcher; *eidos*, resemblance]: resembling the mouth of a pitcher; in *anat.*, applied to two small cartilages at the opening of the larynx to which the vocal chords are attached.

ARZIGNANO, *ârd-zên-yâ'nō*: town of n. Italy, 11 m. w. by s. from Vicenza. Pop. 3,000.

AS, conj. prep. or ad. *âz* [contr. of AS. *eallswa*, all so: Ger. *als*]: signifying agreement in manner in general; likeness of manner; for example: equally.



## AS—ASA.

AS, rel. pron. *az* [Icel. *es*: mod. Icel. *er*, rel. pron., *as*]: in old and common Prov. Eng., a relative pronoun used instead of *who*, *which*, and *that*, as, 'bring the box *as* stands at the fire-place'; 'he had a daughter *as* was named Hannah': see Skeat.

AS, n. *ās* [L.]: the designation both of a Roman weight (called also *libra*) corresponding very nearly to an English *pound* (q.v.), and of a coin made of the mixed metal *aes*, or bronze. The As (coin) originally no doubt weighed a (Roman) pound; but it was gradually reduced to  $\frac{1}{32}$  of a pound, and even lower. It is thus difficult to assign any fixed value to the As. About B.C. 270, the denarius (abt.



As.

17 cents) contained 10 ases; so that the value of the As was then a little less than 2 cents; when 16 ases went to the denarius, the value was about a cent. It was by the *sestertius* (q.v.) that money was reckoned at Rome. The oldest form of As usually bore the figure of an ox, a sheep, or other domestic animal (*pecus*); from which it is usually supposed that the Latin word for money, *pecunia*, is derived.

A'SA, third king of Judah: (reigned B.C. 955–914); son of Abijah, and grandson of Jeroboam. At the beginning of his reign, he was very young, and his character apparently undeveloped, for he allowed his grandmother, Maacah, to encourage idolatry; but on assuming the government, one of his earliest acts was to remove her from all authority 'because she had made an abominable image for an Asherah' (1 Kings, xv. 13; 2 Chron. xv. 16). His zealous efforts to extirpate the vices and impieties of the people were on the whole successful. He took away the Sodomites out of the land, and the altars of the strange gods, broke the images, and cut down the groves. For the next ten years he devoted himself to strengthening the defenses of his kingdom, and organized a magnificent army of more than half a million, which seems to have been looked upon as a menace by other monarchs, for one of these, Zerah the Cushite, took the initiative, and penetrating through *Arabia Petræa*, invaded Judah, but was defeated with immense slaughter. Before the battle commenced, Asa had invoked the aid of Jehovah; and some time after the victory, he and all his people entered into a solemn covenant 'to seek the Lord God of their father with all their heart and with all their soul' (2 Chron. xv.

## ASA DULCIS—ASAFETIDA.

12). Peace lasted for twenty years in the kingdom, but in the 35th year of Asa's reign, war again broke out between him and Baasha, king of Israel. He sought and obtained the aid of the Syrian monarch, Benhadad; but at the expense of 'the treasures of the house of Jehovah,' and although successful against his adversary, he was indignantly upbraided and threatened by the prophet Hanani for not relying on Jehovah alone. Asa, flushed with success, threw the prophet into prison, and, it would appear, 'in his rage' oppressed some of the people at the same time—perhaps those only who sided with Hanani, for we know that at his death the nation honored him with a splendid funeral; and the sacred historian pays the highest tribute to his memory, declaring that 'Asa's heart was perfect with the Lord all his days.'

**ASA DULCIS**, *ās'ā dūl'sīs* [i.e., Sweet Asa]: a drug in high repute among the ancients as an antispasmodic, deobstruent, and diuretic; also for supposed virtues of the most extraordinary kind, such as neutralizing the effects of poison, curing envenomed wounds, restoring sight to the blind, youth to the aged, etc. Its value was estimated by its weight in gold. The princes of Cyrene caused a figure of the plant producing it to be struck on the reverse of their coins, and it was sometimes called *Laser Cyrenaicum*. The plant is of the genus *Thapsia* (of the natural order *Umbelliferae*), either *T. Garganica*, or a nearly allied species, *T. Silphium*—perhaps the drug was produced by both. They are natives of the s. of Europe and of Barbary, and appear to be very active purgatives.

**ASAFETIDA**, or **ASSAFÆTIDA**, n. *ās'ā-fèt'ì-dà* [L. *asa*, a gum; *fætīdus*, fetid: Ar. *asā*, healing]: a gum-resin, which has been supposed to be identical with the exuded juice of the *Silphion* of Dioscorides, so highly esteemed among the Greek physicians; but which, perhaps, was the *Asa dulcis*. Its name is perhaps derived from the Persian word *asa*, which means *mastic*. This drug is brought from Persia and Afghanistan, and is procured by drying the milky juice which flows from the root of the plant *Ferula* (*Narthex*) A., which has been referred to the genus *Ferula* by Linnæus, and to *Narthex* by Dr. Falconer. The root of the A. plant is long and generally undivided; white inside, but having a black covering; and contains in its interior a quantity of juice of an overpowering odor, which much resembles that of garlic. *Ferula* or *Narthex* A. has its radical leaves tripartite, their segments bipinnatifid, and nearly two ft. in length. The gum-resin is said by some to be obtained also from *Ferula Persica*, a plant which has the root-leaves very much divided, and all either tripinnate or quadripinnate. The name *ferula*, like the Persian *asa*, refers to the appearance of the stem of the plant. *Ferula Persica* has long been propagated successfully in Britain, and even brings its seeds to perfection.

A. is prepared in the dry southern provinces of Persia, but chiefly in Khorassan and Afghanistan, and also to the n. of the Hindu Kush range of mountains. About April,



## ASAPHES—ASARABACCA.

the root-leaves are taken away, and the root itself is more or less exposed by removal of the soil from about it. After six weeks, a slice is cut horizontally from its summit, and a thick white juice exudes, the smell of which even exceeds in strength that of the drug when dry. The drug is sometimes brought to the market in the form of tears, but more frequently in lumps made up of irregularly shaped tears, agglutinated together by a softer substance. *A.* is extensively used in medicine, and has stimulant and anti-spasmodic properties. When taken internally it undergoes absorption, and may be detected in almost every secretion of the body, as the saliva, breath, and urine. According to the analysis of Pelletier, *A.* is composed of the following substances: resin, 65 parts; volatile oil, 3·6; gum, 19·44; bassorin, 11·66; various salts, 30. In many parts of the East, this drug is used as a condiment, in which respect it seems to take the place of the garlic of some European nations.

ASAPHES, n. *ās'ā-fēz* [Gr. *asāphēs*, dim, indistinct]: genus of Ichneumons, of which the best-known species, *A. vulgaris*, deposits its eggs in aphides, on which the larvæ, when hatched, prey.

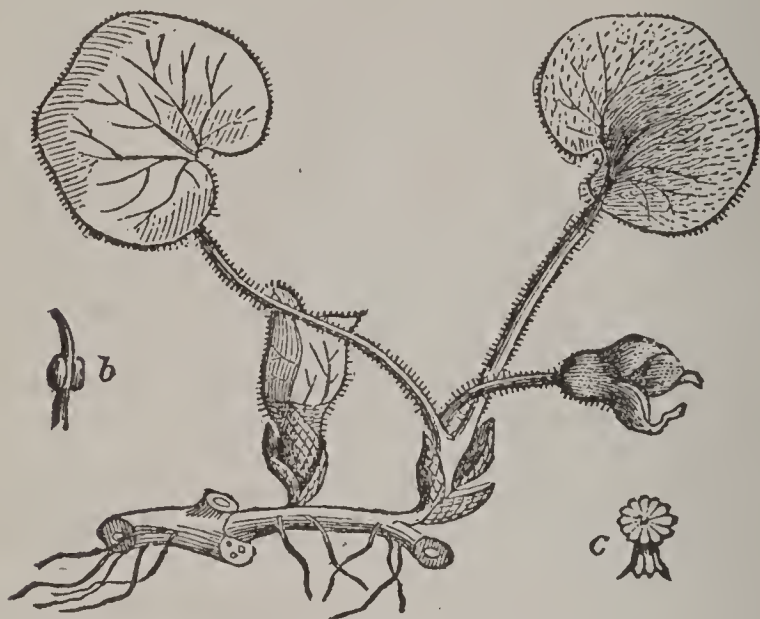
ASAPH, ST., *sānt az'af*: cathedral city, a station on the Vale of Clwyd railway; on a small hill between the rivers Clwyd and Elwy, in the n. of Flintshire, Wales. The cathedral, on top of the hill on which the city is built, is cruciform, 178 ft. by 68 ft., with a tower 93 ft. high; one of the smallest of British cathedrals. It was built, 1284, on the side of a wooden structure founded before 596. Kentigern, or St. Mungo, Bishop of Glasgow, and his disciple St. A., are said to have founded the see of St. A. in the 6th c. The bishop, who has a revenue of £4,200, is patron of 121 of the 148 benefices in the diocese. St. A., with the Flint district of boroughs, returns one member to parliament. Pop. of St. A. (1891) 1,900.

ASAPHUS, n. *ās'ā-fūs* [Gr. *asāphēs*, obscure]: in *geol.*, a genus of trilobites, so named from the obscurity resting on their true nature, being at first confounded with insects. See TRILOBITE.

ASARABACCA, n. *ās'ār-ā-bāk'ā* [L. *asārum*, wild spike-nard; *bacca*, a berry]: *Asarum Europæum*: plant of the nat. ord. *Aristolochiaceæ* (see ARISTOLOCHIA); native of Europe, growing in woods; rare, perhaps not truly indigenous, in Britain. The whole plant has acrid properties; the roots and leaves are aromatic, purgative, and emetic. The use of *A.*, however, as an emetic has been much superseded by that of ipecacuanha, which is milder and safer. The powdered roots and leaves enter into the composition of cephalic snuffs, which cause sneezing, and are employed as a counter-irritant in cases of headache, ophthalmia, toothache, etc. The plant contains a volatile oil, and a crystalline substance called ASARINE, *ās'ār-īn*, or ASARONE, to which it seems to owe its active properties. The genus *Asarum* is distinguished by twelve horned stamens, distinct from each other and from the style, and by a bell-shaped three-lobed

## ASARUM—ASBEN.

perianth. *A. Europæum* has a very short stem with two shining kidney-shaped leaves on long stalks, from the axil of which springs a single drooping greenish-brown flower. —A nearly allied species, *A. Canadense*, a native of N.Amer.



*Asarabacca (Asarum Europæum).*

*b*, detached anther; *c*, style.

is stimulant and diaphoretic, and is used under the name of CANADA SNAKE-ROOT, instead of *Aristolochia Serpentaria*. It is also called WILD GINGER, and used as a spice, being of a warm aromatic quality, and not acrid, like its European congener.—Two other species, Va. and south.

ASARUM: see ASARABACCA.

ASBEFERRITE, n. *ăz-bě-fěr'rīt* [Ger. *asbestos*, inextinguishable: L. *ferrum*, iron]: a grayish-white, or ash-gray mineral, a variety of amphibole. Dana classes A. with dannemorite under the head 'Iron-Manganese Amphibole.'

ASBEN, *ăs-běn'*, or A'İR: see AIR.



## ASBESTOS—ASBOLINE.

**ASBESTOS**, n. *ās-bēs'tōs*, or **ASBES'TUS** [Gr. *asbestos*, unquenchable]: a fibrous mineral of the hornblende family, having the fibres elastic and flexible, somewhat resembling flax, and which cannot be consumed by fire; the different varieties receive the names of *rock-wood*, *rock-cork*, *mountain-leather*, *fossil paper* or *flax*, etc. **ASBESTINE**, a. *ās-bēs'tīn*, of or like asbestos. **ASBES'TIFORM**, a. *-tī-fawrm* [L. *forma*, shape]: assuming the fibrous character of asbestos; like asbestos. **ASBESTIC**, a. *ās-bēs'tīk*, pertaining to asbestos; made of asbestos. **ASBESTOID**, n. a mineral resembling asbestos in form; called also byssolite: **ADJ.** of the form of asbestos; fibrous.

**ASBESTOS**, *ās-bēs'tōs*, or **ASBES'TUS**, *-tūs*: mineral substance, var. of amphibole (when not fibrous serpentine), akin to hornblende, actinolite, and tremolite; like these, it consists chiefly of silica, magnesia, alumina, and ferrous oxide; but there are wide differences between specimens. The production in the U. S. 1901, from Sall Mountain, Ga., Riverside co., Cal., and Berkshire co., Mass., was 747 short tons, value \$13,498. A. consists of crystalline elastic fibres, of silky lustre, and varying in color from white to gray or green. Woven into cloth, it forms a fireproof texture. The most prized variety of A. is *Amianthus*, with fibres snowy white, long, and flexible; it occurs abundantly in Canada. The inferior qualities have shorter and less flexible fibres, and usually are of dark color; besides, they are of greater specific gravity: they are known as *common asbestos*, *mountain leather*, and *mountain wood*. The long-fibred A. is spun into threads, which are woven into fabrics used for filter-linings and for lagging in steam-boilers. The threads are used also for stuffing steam-pipe joints, and a large rope of them serves for piston-packing. Paper has been made of A., and would prove invaluable, in case of fire, for charters and other important documents, were it not that the writing disappears when the material has been subjected to a red heat. Patents have been granted in the United States upon methods of using A. for fire-brick and crucibles, as an absorbent in lamps and carburetters, as a boiler-covering, etc.; also as a material for coffins: instead of coffins made all of asbestos, it is usual now merely to line a wooden shell with A. paper. Roofing materials of A. consist of a roof-coating and a cement for repairing metal roofs. An A. felt is manufactured for use wherever steam-pipes, boilers, furnaces, etc., need to be confined to prevent radiation.

**ASBJÖRNSSEN**, **PETER CHRISTEN**: 1812, June 15—1885, Jan. 6; b. Christiania, Norway: distinguished author. He studied at the university, and, 1858, was appointed superintendent of forests. His official duties gave him opportunity for collecting the popular tales of the peasantry; and he is known for his great collection of *Norwegian Folk-tales* (1842, extended with the help of J. Moe), and his *Norwegian Fairy Tales and Folklore* (1845; 3d ed. 1870).

**ASBOLINE**, *ās'bō-līn* [Gr. *asbolos*, soot]: in chem., a

## ASBOLITE—ASCALON.

yellow, oily substance, very acrid and bitter, obtained from SOOT.

ASBOLITE, n. *ăz'böl-īt*, or ASBOLAN, *ăz'böl-ăn* [Gr. *asbolainō*, to cover with soot]: called also earthy cobalt. Dana makes it a variety of wad, and considers it to be that mineral combined with oxide of cobalt.

ASBURY, *ăs'bēr-ĭ*, FRANCIS: 1745–1816; b. Staffordshire, Eng.: ordained, 1784, the first bishop of the Meth. Epis. Church in the United States. Apprenticed to a mechanic in 1759, in Staffordshire, the preaching of an itinerant Meth. preacher turned his mind to religion, and two years later, at the age of 16, he began to preach in his own neighborhood. He became an itinerant, 1767, preached for three years in England, and was sent, 1771, as a missionary to America. John Wesley appointed him general assistant for this country. In his new and responsible position, A. soon infused fresh vigor into the cause in America, dispatching missionaries all over the country, organizing new societies, and preaching with great force and eloquence. He remained in the colonies during the Revolutionary war, showing great discretion. In 1784, it was determined to establish an independent Meth. Epis. Church in America, and A. was made joint superintendent with Thomas Coke, who had been ordained by Mr. Wesley. In the following year the first Meth. college in America was founded. A. was a passable Greek and Hebrew scholar, though without a university education. He never married, from a determination to devote himself to his great work. The statistics of his professional career are remarkable: he is said to have travelled over 270,000 m., presided at 224 conferences, ordained more than 4,000 ministers, and preached more than 16,000 sermons. He left three vols. of his 'Journals,' which are highly esteemed.

ASBURY PARK, *ăs'bēr-ĭ*: post-village in Ocean tp., Monmouth co., on the Atlantic Ocean, N. J., 6. m. s. of Long Branch; 51 m. from New York. It is a favorite summer resort, covering abt. 500 acres, handsomely laid out, with a public hall, free reading-room, and other advantages. It contains a number of large hotels and numerous boarding houses, and the drives in the vicinity are attractive. Between Asbury Park and Ocean Grove is Wesley Lake, about three quarters of a m. long, a beautiful sheet of water devoted to boating. Pop. (1900) 4,148; summer visitors number above 25,000.

ASCALAPHUS, n. *ăs-kăl'ă fŭs* [Gr. *askalaphos*, a word in Aristotle, apparently meaning a kind of owl]: genus of neuropterous insects belonging to the family *Myrmeleon-tidæ*, or Ant-lions. They differ from the *Myrmeleon* proper in having much longer antennæ and shorter bodies, while their larvæ do not construct a pitfall.

















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